

Marine and Freshwater
Beach Testing in Massachusetts

Annual Report
2003 Season



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Center for Environmental Health

Environmental Toxicology Program

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INTRODUCTION

A. OVERVIEW

Massachusetts has an extensive collection of recreational waters, including both freshwater and marine bathing beaches. These beaches serve as recreational resources to the local communities and, in some cases, as a source of tourist dollars to the local economy. It is of vital importance to ensure that the beaches remain safe for public use. Recreational use of water with microbial contamination can pose health risks to swimmers and others. As a result, beach water quality is regulated to protect public health. In Massachusetts, bathing beach water quality is regulated by M.G.L. C. 111, § 5S and regulations cited as 105 CMR 445.000: Minimum Standards for Bathing Beaches (State Sanitary Code, Chapter VII; Appendix A). All public and semi-public bathing beaches in Massachusetts must be monitored for bacterial contamination during the bathing season. The bathing beach season in Massachusetts runs from as early as Memorial Day in some areas, through Labor Day during most years.

Water samples that are found to contain levels of bacterial contamination in excess of regulatory standards are termed exceedances. If water samples from a beach are found to be in exceedance of regulatory standards, the beach must be posted as unsafe for swimming due to bacterial contamination. A posting is a sign placed at access points to a beach indicating that this is the case. The term posting also refers to the corresponding notification that must be submitted to the Massachusetts Department of Public Health (MDPH) when this occurs (105 CMR 445.033).

Local boards of health (LBH), the Barnstable County Department of Health and the Environment, the Department of Conservation and Recreation Division of Urban Parks and Recreation (DCR-DUPR) and Division of State Parks and Recreation (DCR-DSPR) conduct the vast majority of beach water sampling in Massachusetts. Most marine beach samples are analyzed at MDPH contracted laboratories. Most freshwater samples are analyzed at private labs, while some are analyzed at municipal facilities.

The Massachusetts Beaches Act was passed in 2000, requiring all public and semi-public beaches to be tested weekly during beach season using standard indicators. In 2000, the U.S. Congress enacted the Beaches Environmental Assessment and Coastal Health (BEACH) Act that amended the Federal Water Pollution Control Act (commonly referred to as the Clean Water Act, or CWA) to improve the quality of coastal recreational waters (Appendix B). The BEACH Act seeks to reduce the risk of disease to users of the Nation's marine recreational waters through the identification of high-risk beaches, identification and mitigation of sources of pollution, and notification/risk communication to the public. It also authorizes grants to eligible states to support these objectives.

In late 2001, MDPH was awarded funding from the United States Environmental Protection Agency (USEPA) that partially supports Department efforts to (1) develop an inventory of marine bathing beaches, (2) compile monitoring data, and (3) to conduct assessments of those beaches identified as high-risk. The MDPH Bureau of Health Quality Management, Division of Community Sanitation (DCS), conducted a survey of

Massachusetts municipalities in order to establish an inventory of all public and semi-public marine and freshwater beaches. They also collected data from reporting local health departments and other agencies for the 2002 bathing season and provided these data to the Department's Bureau of Environmental Health Assessment (BEHA), Environmental Toxicology Program (ETP). In 2003, MDPH used Beach Grant funds to contract five laboratories (Barnstable County Health Department Laboratory, Town of Chatham Water Quality Laboratory, Dukes County Testing Laboratory, New Bedford Health Department Laboratory and G & L Laboratory) to process regular weekly samples for public, marine beaches in Massachusetts, and to report the data directly to MDPH. Freshwater data were reported by local Boards of Health, as in the past. This report presents the results and analysis of this 2003 data from Massachusetts marine and freshwater bathing beaches.

II. BACKGROUND

A. INFORMATION ON BEACH WATER QUALITY

1. Health Effects from Swimming in Marine Waters

Several prospective and retrospective epidemiological studies (Cabelli, 1983; USEPA 1986; Cabelli, 1989; Haile, 1996; Pruss, 1998) have concluded that swimming in polluted marine water poses health risks to swimmers. This conclusion is based on the observation that there is an increased rate of adverse health effects among swimmers compared to non-swimmers in marine waters. Swimming in polluted marine water can lead to gastrointestinal symptoms (e.g., nausea, vomiting, diarrhea, abdominal pain), respiratory symptoms (e.g., sore throat, cough, chest cold, runny nose, sneezing), eye and ear symptoms (e.g., irritation, earache, itchiness), dermatological symptoms (e.g., skin rash, pruritis), and constitutional symptoms (e.g., fever, chills). One retrospective study found the relative risk of gastrointestinal illness among swimmers in polluted waters to be 1.0 to 3.0 times the risk of non-swimmers (Pruss 1998). The epidemiological studies suggest that swimmers may be exposed to pathogens (disease-causing microorganisms) while swimming. Pathogens in marine waters typically have a fecal source. Pathogens associated with human fecal matter (e.g., some strains of *Escherichia coli*) may be present in the water due to a variety of sources including but not limited to ocean disposal of sewage by boats, sewage treatment plant outfalls, illegal sewage hookups and combined sewer overflows. Bathers may also contribute significantly to pathogen concentrations in recreational waters (Gerba 2000). Pathogens may be ingested or absorbed while swimming, thereby causing an increased risk of disease among swimmers relative to non-swimmers (Cabelli *et al.*, 1982; Cabelli, 1983; Cabelli, 1989; Coye and Goldoft, 1989; CDC, 1990-2002; Corbett *et al.*, 1993; Haile 1996).

2. Beach Water Quality Testing Methods - Marine

The pathogens that cause swimming-associated disease are very difficult to measure directly. Furthermore, because of the wide variety of different pathogens that might be present in marine waters, measuring all possible pathogens is not practical for routine testing programs. Therefore, public health officials typically estimate the potential for pathogens to be present in the water by testing the water for a microorganism or a group of microorganisms whose life cycle(s) mimics that of specific pathogens but which are easier to measure than the pathogens themselves. Because they indicate when pathogens are likely to be present, these microorganisms or groups of microorganisms are called “indicators” (Cabelli, 1983).

In the United States, concern about pathogens in marine waters typically has been related to pathogens associated with fecal contamination (Cabelli, 1983). As a result, methods commonly used in this country test for an indication of the degree of fecal contamination of the water. The most accurate indicators of fecal contamination are specific microorganisms (e.g., *Escherichia coli*, *Streptococcus faecalis*, or *Clostridium perfringens*) that are present predominantly in human and animal feces (Cabelli, 1983). Testing for a single indicator species, however, can fail to detect the presence of fecal pathogens if that indicator species does not survive in the natural environment for as long as the fecal pathogens themselves do (NAS, 1977). Therefore, methods that test for groups of microorganisms, such as total coliforms, fecal coliforms, or Enterococci, are frequently used instead (Cabelli, 1983). These tests are usually easier and faster to perform than those that test for specific indicator species. In the case of Enterococci, they also strongly correlate with swimming-associated disease (USEPA, 1986, Pruss 1998). One disadvantage of using groups of microorganisms as indicators is that these tests can falsely predict the presence of fecal contamination if organisms that are not associated with fecal contamination are detected by the method (NAS, 1977; Cabelli, 1983; Barrell et al., 2000). For public health purposes however, it is prudent to respond to such indicators to prevent adverse health outcomes.

As of the year 2000, Enterococci are the required indicator organisms for determining levels of contamination at marine bathing beaches in Massachusetts. In the past, total coliforms and fecal coliforms were used as indicators for marine bathing beaches. In 2003, all marine beaches in Massachusetts that reported data used Enterococci for a routine monitoring indicator. The methods for detecting and criteria set for Enterococci are described below. The methods and criteria for fecal coliform and total coliform are also included.

a) *Enterococcus Method*

Similar to the total and fecal coliform methods, the Enterococcus method detects the number of bacteria that grow under certain laboratory conditions (USEPA, 1985). However, the Enterococcus method detects fewer total species than either the fecal or total coliform methods. The Enterococcus method measures the concentration of bacteria from a group of species within the *Streptococcus* genus, some of which (e.g., *Streptococcus faecalis*) are typically found in human and animal intestines (USEPA,

1985). Because some of the species that are detected by this method are not associated with fecal contamination (USEPA, 1985), this method can produce false-positive results, like the total and fecal coliform methods. In addition, some bacterial pathogens and all viruses are not detected by this method.

In 1986, the USEPA (1986) recommended that *Enterococcus* be used as an indicator of water quality at marine bathing beaches. This recommendation was based on studies by Cabelli (1983) at three locations (New York, NY; Boston, MA; and Lake Pontchartrain, LA). In these studies, Cabelli (1983) found that gastrointestinal symptoms reported by swimmers were strongly correlated with *Enterococcus* levels, but not with levels of total or fecal coliforms. Additionally, in 1997 USEPA approved and adopted *Method 1600: Membrane Filter Test Method for Enterococci in Water*. This method enabled faster turnaround time for testing of *Enterococcus* as an indicator of water contamination, thereby making the method practical for local use. This is the method required by MDPH regulations for use in Massachusetts marine waters. In 2003, USEPA approved and adopted a number of new culture and enzyme-substrate methods for testing both *Enterococci* and *E. coli* in ambient water. (Jagals et al, 2000; Federal Register, 2003)

In 2003, the USEPA approved several new laboratory methods of analyzing recreational water for bacterial contamination (Jagals et al, 2000; Federal Register 2003). In some cases the new methods can provide results in less time than the 24-48 hours currently required. The new methods are expected to come into widespread use over the next several years.

b) *Fecal Coliform Method*

The fecal coliform test is similar to the total coliform test in that it measures the number of bacteria (including *Escherichia coli*) that can grow under certain laboratory conditions. However, the fecal coliform test only measures a subset of the species detected by the total coliform method. As a result, the fecal coliform test detects fewer organisms that are not associated with fecal contamination than the total coliform test, thereby reducing the chance of false-positive results. False positive results are still possible, however, because the fecal coliform method does detect some bacteria that have other sources besides human and animal feces (Cabelli, 1983). The fecal coliform method, like the total coliform method, can fail to detect waterborne pathogens in some cases because it does not detect all waterborne pathogens or viruses.

c) *Total Coliform Method*

The most general, but no longer recommended, testing method is the total coliform method. This method measures the number of bacteria in a water sample that will grow under certain laboratory conditions (Cabelli, 1983). A large number of different kinds of organisms are measured by this method, some of which are found exclusively in human and animal intestines (i.e., *Escherichia coli*) (Cabelli, 1983; USEPA, 1985). The advantages of this testing method are that it can be performed quickly and it is relatively sensitive to the presence of fecal contamination given the large number of species that it can detect. However, this method can falsely predict the presence of fecal pathogens

because some of the species that are detected by the method (e.g., some species in the genus *Aeromonas*) are not found exclusively in human and animal feces (NAS, 1977; Cabelli, 1983). Furthermore, some waterborne pathogens (e.g., *Salmonella typhi*) and all viruses (e.g., Hepatitis A) are not detected by this method (NAS, 1977).

3. Historical and Current Water Quality Criteria - Marine

Water quality criteria are guidance concentrations that are used by public health officials to make decisions regarding the health risks associated with swimming. These criteria are typically expressed as the concentration of an indicator in the water above which there is an unacceptable risk for adverse health effects resulting from swimming. The concentrations of a microorganism in water are usually reported as the number of colony forming units (CFU) of indicators per 100 milliliters (ml) of water. For any given measurement of the indicator species in water, the actual health risk from swimming in that water will depend on what pathogens are present in the water. Therefore, to make a decision as to the actual health risk related to a particular beach, other factors in addition to water quality criteria for indicator species should be considered, such as recent rainfall patterns and the number of people who use the beach.

a) *Enterococcus*

In 1986, USEPA published *Ambient Water Quality for Bacteria – 1986*. In this document, USEPA recommended *Enterococcus* instead of fecal or total coliforms as the indicator of marine water quality and provided a scientific rationale for its use. *Enterococcus* is currently the mandated indicator organism for routine monitoring of Massachusetts bathing beaches (105 CMR 445.000).

The recommended use of *Enterococcus* was based on studies by Cabelli (1983) that tested many different indicator organisms at several beaches in the United States to see which indicator organism correlated best with the incidence of acute gastrointestinal disease among swimmers. These studies showed that the concentration of *Enterococcus* in marine waters was more strongly correlated with the incidence of swimming-associated gastroenteritis than the concentrations of other indicators, including total and fecal coliforms. From these data, a relationship between the number of cases of swimming-associated disease and the *Enterococcus* concentration in the water was established. USEPA (1986) used this relationship to establish the criteria for *Enterococcus* in marine waters at 104 CFU per 100 ml for a single sample and 35 CFU per 100 ml for the geometric mean of at least five samples over a 30-day period. These criteria were set such that the expected incidence of gastrointestinal illness among swimmers would be the same as it had been for the previous USEPA water quality criteria for fecal coliform (i.e., 19 illnesses per 1000 swimmers at marine beaches). MDPH adopted this standard beginning with the 2000 bathing season.

b) Fecal Coliform

In 1968, fecal coliform replaced total coliform as the recommended indicator species for marine water quality, however, as mentioned, fecal coliform is no longer recommended under state regulations. At that time, the National Technical Advisory Council (NTAC) of the Federal Water Pollution Control Administration established criteria for the geometric mean of the fecal coliform count over a 30-day period (for a minimum of five samples) at 200 CFU per 100 ml with no more than 10% of the samples exceeding 400 CFU per 100 ml. These values correlated with a level of risk of no more than 19 cases of acute gastrointestinal illness per 1,000 swimmers in marine waters. USEPA adopted this standard in 1976. By 1978, the majority of states and territories had adopted this standard as well (Cabelli, 1983; USEPA, 1986).

c) Total Coliform

Formerly, the water quality criterion used by the Massachusetts Department of Public Health was based on the use of total coliforms. Specifically, the total coliform concentration could not exceed 1,000 CFU per 100 ml. After its establishment, this criterion was adopted by the Joint Committee of the American Public Health Association, the State Sanitary Engineers, and many states (Cabelli, 1983).

4. Health effects from swimming in freshwater

Several studies conducted by the USEPA and others (Dufour, 1984; USEPA, 1986; Cabelli, 1989; CDC, 1991-2002) have observed gastrointestinal symptoms (e.g. nausea, vomiting, diarrhea, abdominal pain) as a result of swimming in fresh waters. The results of these studies have suggested that swimmers may be exposed to pathogens while swimming in fresh waters. Pathogens associated with human fecal matter may be present in fresh waters as a result of system failures in human sewage treatment facilities, or rainfall and resulting surface water runoff and other factors. Leachate from septic systems may be a potential source of microbiological contamination as well as animal wastes due to runoff that is exposed to domestic animal waste (e.g. wastes from dogs or farms). Swimmer-to-swimmer contamination is another potential source for microbiological contamination. Swimmers, bathers, waders, surfers, and others who come into full- or most-body contact with swimming water may all contribute to contamination (California 1997; Gerba 2000).

5. Beach Water Quality Testing Methods – Freshwater

As indicated in the regulation (105 CMR 445.031), the indicator organisms for freshwater bathing beaches are *E. coli* and Enterococcus based on research conducted by USEPA (Dufour, 1984; USEPA, 1986). The Enterococcus method has already been discussed (see Section III.C.3).

a) *E. coli* Method

Escherichia coli (*E. coli*) is a species of bacteria that is found exclusively in human and animal intestines (USEPA, 1985). Certain strains of this species are enteric (i.e., intestinal) pathogens (NAS, 1977). While both the total and fecal coliform methods can detect *E. coli* as part of a group of organisms, the *E. coli* method tests specifically for the presence or absence of this particular species. Because *E. coli* is exclusively found in human and animal intestines, this method is a very sensitive indicator of fecal contamination for freshwater beaches (USEPA, 1985).

6. Current Water Quality Criteria – Freshwater

As noted in Section III. C., for any given measurement of the indicator species in water, the actual health risk from swimming in that water will depend on what pathogens are present in the water. Therefore, to make a decision regarding the health risk related to a particular beach, other factors must be considered in addition to water quality criteria for indicator species, such as recent rainfall patterns and the number people who use the beach.

a) *E. coli*

For freshwater, no single *E. coli* sample shall exceed 235 CFU per 100 ml and the geometric mean of the most recent five *E. coli* samples within the same bathing season shall not exceed 126 CFU per 100 ml. These are the criteria established in MDPH regulations (105 CMR 445.031).

b) *Enterococcus*

For freshwater, no single *Enterococcus* sample shall exceed 61 CFU per 100 ml and the geometric mean of the most recent five *Enterococci* samples within the same bathing season shall not exceed 33 CFU per 100 ml. These are the criteria established in the regulations (105 CMR 445.031).

Both *E. coli* and *Enterococcus* standards are based on studies (Dufour, 1984; USEPA, 1986) that showed a strong correlation between levels of *E. coli* and *Enterococcus* and rates of swimmer-associated gastrointestinal disease in freshwaters. The values are set to a level of risk of no more than eight cases of acute gastrointestinal disease per 1,000 swimmers in freshwater beaches.

B. MDPH ACCOMPLISHMENTS IN 2003

1. Beaches Website

In 2003 an electronic, web-based system for public notification of marine beach postings and water quality monitoring data was developed by MDPH in conjunction with Garrison Enterprises. The website was developed with funding support made available through the

USEPA Beaches Grant. The website can be reached from the home page of the MDPH website (<http://www.mass.gov/dph>) by clicking on the “Beaches Initiative” hyperlink or directly at: <http://www.state.ma.us/dph/beha/tox/reports/beach/beaches.htm>. Beach postings can be viewed by navigating a series of maps to select an individual community (Figures 16, 17). Once the community is selected, a listing of all marine beaches in that community is displayed along with the status of the beach (Figure 18). Posted beaches are displayed with a red flag. From this page the user can also view the complete list of individual water quality samples for a beach by selecting “View Lab Data”. The website also supports reporting routine water quality monitoring data through a series of password protected data entry pages. In 2003, data was entered on the site by MDPH personnel to provide as near real-time public notification as possible. The website automatically generates postings as samples are entered for those that exceed single-sample or geometric mean regulatory limits.

2. Beach Mapping Project

A detailed Geographic Information System (GIS) layer for Massachusetts marine bathing beaches was developed by MDPH with assistance from Applied Geographics, Inc. (AGI), and with considerable information from local health officials. In the spring of 2003, detailed color aerial photo maps were prepared by AGI for all 60 coastal communities with marine bathing beach polygons highlighted (Figures 19-21). AGI also calculated the miles of sandy coastline (approximately 727 miles) in Massachusetts. This work was partly based on preliminary GIS work done by MDPH in the fall of 2002 that mapped the location of approximately 200 marine bathing beaches. The color maps were printed and mailed to local health officials in each marine beach community in the spring of 2003. Local health officials were asked to mark on the maps the locations and specific boundaries of each known beach, the designations of each beach – public or semi-public (and private if known), the location or locations where the water samples are taken for routine monitoring, the location at each beach where posting (i.e., posting/closure due to bathing water quality violation) would occur in the event it is necessary, and the locations of normal access points and parking lots. The marked up maps were returned by local health officials to MDPH.

MDPH beach inspectors utilized the maps for the evaluation of each marine beach in each of the 60 coastal communities. Beach inspectors used a global positioning system (GPS) unit to collect beach boundary points, sample locations, posting points, access points, and possible pollution sources using the marked up maps provided by local health officials. As points were obtained, the beach inspectors downloaded them onto their computers. The files were sent to a GIS analyst via e-mail and were then joined together into one GIS point layer. Descriptions of each point were broken out into database fields in the GIS, the points were checked versus the marked up maps, and assigned USEPA Beach IDs. Lines were drawn between boundary points following the coastline for each beach and were put into a GIS line layer. This line layer was used to calculate beach mileage for public and semi-public beaches, and was compared to the earlier sandy coastline mileage calculation generated by AGI. These GIS point and line layers for all

60 coastal communities compiled by MDPH verified and completed the GIS point and line layers that AGI had begun for approximately 15 coastal communities.

The completed GIS point layer and line layer for 510 marine bathing beaches, including 419 public beaches and 91 semi-public beaches, as well as the estimated mileage of public (153.1 miles), semi-public (50.7 miles), and private beaches (522.4 miles) in Massachusetts were sent by MDPH as required deliverables to USEPA in October 2003. The process of developing the beaches GIS layer was also shared with other New England states through a presentation given by MDPH at the USEPA Quarterly Working Group meeting in October of 2003.

3. Training

During 2003, MDPH held training sessions for local health officials at the start of the beach season. The training sessions were held in Wareham and in Danvers to ensure adequate coverage for all marine beach communities in the state. Sampling methodology and use of standardized field sampling forms were reviewed. Current regulations were also discussed. In addition, MDPH introduced its new public notification website and provided a detailed overview of its ongoing GPS survey of marine beaches in Massachusetts. Additional technical guidance was also provided in subsequent mailings to local health officials.

4. Laboratory Programs

In 2003 MDPH requested, and was given permission to use some of the federal beach funds to provide partial funding support to local communities for routine compliance and monitoring required under Massachusetts regulations 105 CMR 445.000, Minimum Standards for Bathing Beaches State Sanitary Code Chapter VII. Because of the administrative burdens that would be associated with coordinating with the 60 eligible communities, MDPH instead undertook a procurement process to qualify laboratories capable of serving all coastal areas of the state.

Requests for Responses (RFR) were posted on the Commonwealth Procurement Access and Solicitation System (Comm-PASS) professional services open solicitation section. Evaluation criteria were grouped into sample collection, management, and value. The contract awards were based on the outcome of this process. The MDPH received responses and proposals from eight entities and awarded five contracts valued at nearly \$90,000. The laboratories selected were Barnstable County Department of Health and the Environment Water Quality Testing Laboratory, Chatham Water Quality Laboratory, Dukes County Testing Laboratory, G&L Laboratories, and the New Bedford Health Department Laboratory. These laboratories analyzed 7,451 samples from 60 Marine beach communities during the 2003 bathing season.

5. Press Event

On June 13 2003, the Commonwealth of Massachusetts and USEPA sponsored a National Press Conference at Wollaston Beach in Quincy to highlight USEPA New England's Clean New England Beaches Initiative. Other highlights included an unveiling of the MDPH public notification website for bathing beach water quality monitoring results, the only real-time state-wide beach condition notification website in the country at that time; the release of the MDPH 2002 Annual Beach Report; an announcement of the availability of funding support for local marine communities by MDPH and an introduction of the Flagship Beach Initiative. Speakers included Massachusetts Governor Mitt Romney, former USEPA Administrator Christie Todd Whitman, USEPA Regional Administrator Robert Varney, MDPH Commissioner Christine Ferguson as well as other state and local officials. The event generated widespread public interest and national press coverage.

6. Tiered Classification Plan

The *Public Health-Based Beach Evaluation, Classification, and Tiered Monitoring Plan* was released by MDPH for public comment in June 2003. The proposed Plan presented an overview of the MDPH Beach Program activities and included an explanation of MDPH's proposed three-tiered classification plan for marine beaches. The Plan has been developed in order to ultimately direct water quality monitoring resources to the beaches that pose the greatest health concern so as to facilitate the identification and clean up of pollution problems, while those beaches with more pristine records can be monitored less often than initially required weekly routine monitoring through a variance process pursuant to both the Massachusetts and federal beach acts. In this system, every beach was classified as "Tier One," "Tier Two," or "Tier Three." Tier One includes heavily used beaches which have pollution problems. USEPA believes that these beaches should be tested at least twice per week. Because of the ongoing pollution concerns/violations, these beaches are generally sampled more than once a week. Tier Two includes beaches with some pollution. These beaches must be tested once per week. Tier Three includes beaches with no known pollution problems. These beaches are required to be tested once every two weeks or sometimes less, as determined by MDPH through the variance process. In the proposed Plan, each beach was listed along with the number of exceedences, the number of postings, and the bather density in the years 2001 and 2002. The Plan also proposed a classification of every marine beach for which MDPH had received data through the 2002 bathing beach season. In the proposed classification scheme, beaches with multiple exceedences for three or more years would be classified as Tier One. Beaches with one exceedence for one or multiple years would be classified as Tier Two, and beaches with zero exceedences for two or more years would be eligible for Tier Three provided that the sample results meet appropriate quality standards and a detailed sanitary survey has been completed that indicates no potential sources of concern. Because no sanitary surveys had been submitted to MDPH for any of these beaches, no beaches were listed Under Tier Three in this 2003 report.

7. Quality Assurance Project Plan for USEPA

A Quality Assurance Project Plan (QAPP) for routine monitoring activities and related beaches project implementation was finalized for the 2003 beach season. This document was required to be submitted and approved before funds could be spent on routine compliance monitoring arranged through the MDPH to benefit the local communities during the 2003 beach season. The QAPP describes the quality assurance, quality control, and related activities, including enforcement aspects, that are in place to ensure the results of the project will meet USEPA's published performance criteria. There are four main parts of the QAPP: project management, data generation and acquisition, assessment and oversight, and data validation and usability. The project management section describes the projects organization, planning, schedule, and performance criteria. The data generation and acquisition section discusses the sampling and analytical methods, chain-of-custody, and instrument/equipment quality control. The section on assessment and oversight outlines the audits and assessments that will be performed to ensure compliance with the QAPP and Standard Operating Procedure (SOP). The final section, data validation and usability, describes the process for reviewing, verifying, and validating data. Appended to the QAPP are copies of: the beach project SOP's for bacteria sampling and laboratory analyses using the Modified *E. coli* Method 1603 and the Modified Enterococci Method 1600; the Massachusetts Minimum Standards for Bathing Beaches State Sanitary Code, Chapter VII; the field data collection sheet; the beach project training document; the sample log-in and custody sheet; the Beach Act data management charter; the SOP's for log-in system data entry; a description of the sampling and analysis plan; information on contracted laboratories; and coastal beach maps.

8. Quality Management Plan for USEPA

A Quality Management Plan (QMP) for all beaches activities under the USEPA Beaches Grant and other activities specific to bathing beach regulations was finalized in August 2003. The QMP is an USEPA-required document that describes how the program will develop, implement, and determine the effectiveness of its quality assurance and quality control policies and procedures. A QMP is divided into ten sections: management and organization of beaches activities, quality system components, personnel qualification and training, procurement of items and services, documents and records, computer hardware and software, planning, implementation of work processes, assessment of the quality system and response, and quality improvement. The management and organization section describes the duties of the individuals involved with the beaches activities and projects and their organizational relationships. The quality system components section includes a description of the various components, including documentation, reviews, assessments, and trainings. The section on personnel qualification and training discusses management and staff training. The procurement of items and services section describes policies on procurements. The documents and records section includes a description of the process for maintaining documents and records. The section on computer hardware and software discusses the process for

developing, installing, maintaining, and evaluating hardware and software for the beaches projects. The planning section includes a description of the beach projects requirements (i.e., regulatory and contractual) and performance criteria for measuring quality. The section on the implementation of work processes describes procedures for quality control of program documentation. The sections on the assessment of the quality system and response and quality improvement discuss how staff will assess and make any necessary improvements to the beaches projects and activities to be implemented under the USEPA grant.

9. Data Submission Plan

The Data Submission Plan for Routine Monitoring under the USEPA Beaches Grant and other activities specific to bathing beach regulations was developed and submitted to USEPA in August 2003. The Plan is an USEPA-required document that describes Massachusetts' plan for submitting the beach data it collects from coastal municipalities to USEPA. USEPA then compiles data from all states to develop a national picture of this information. The plan is divided into three parts. The first part describes the current state beach data system for collecting and storing monitoring and notification data. The second part describes the future state beach data system for collecting, storing, and submitting monitoring and notification data. Finally, the third part lists the timeline for planning, developing, and testing the state beach data system and the date that the data will be submitted to USEPA.

III. METHODS

A. SAMPLE COLLECTION

Local boards of health from the communities in Massachusetts that have public and semi-public bathing beaches are required to submit to MDPH beach field data and lab results for bathing beaches under their jurisdiction. The data collected by each community were based on a field data collection form developed by MDPH. For communities having public, marine beaches and utilizing MDPH-contracted laboratories, the data was submitted directly to MDPH by the laboratories. A few communities opted to utilize non-contract laboratories in 2003. These include Ipswich, Manchester-by-the-Sea, Newbury, Rockport and Kingston. The Boards of Health or Health Departments of these communities faxed the data to MDPH in a timely fashion for public notification on the beaches website. For the 2004 bathing beach season, contracted laboratories will be required to submit the data electronically via a secure internet connection.

Sample collection was required to be in compliance with the *Standard Methods for the Examination of Water and Waste Water* of the American Public Health Association or as approved by the USEPA. The information collected in 2003 included:

- Name of beach
- Community where beach is located
- Geographic coordinate of each beach location
- Number of postings at each beach
- Beach designation, public, semi-public, or private
- Sample identification number
- Date of sample collection
- Time of sample collection
- Weather condition at time of sample collection
- Air temperature
- Wind direction
- Time of last high tide (if applicable)
- Amount of most recent rainfall
- Number of days from end of most recent rainfall to sample collection day
- Sampling agency (i.e., local board of health, DCR-DUPR, DCR-DSPR, outside lab, other)
- Known pollution sources (i.e., boats, wildlife, septic systems, outflow pipes, streams)
- Beach type (i.e., marine or freshwater)
- Bather density (i.e., number of people in the water)
- Water temperature
- Water clarity
- Water salinity
- Observations (i.e., trash, sludge deposits, oils, algae, fish die-off, jellyfish, birds)
- Indicator (i.e., Enterococcus for marine, Enterococcus or *E. coli* for freshwater; note, a small number of communities with freshwater beaches still used the fecal coliform indicator (Arlington, Wareham and Winchester), which is not in compliance with the 105 CMR 445.031)
- Indicator level in colony forming units (CFU) of bacteria per 100 ml of water
- Exceedance (i.e., indicator levels equal to or greater than 104 CFU / 100 ml for Enterococcus in marine waters, 61 CFU / 100 ml for Enterococcus in fresh waters, or 235 CFU / 100 ml for *E. coli* in fresh waters)
- Comments

B. LABORATORY ANALYSIS

Laboratory analysis of samples was also required to be in compliance with the *Standard Methods for the Examination of Water and Waste Water* of the American Public Health Association or as approved by the USEPA. Laboratories that were contracted by MDPH to perform public, marine beach sample analysis were further required to utilize the Modified Enterococci Method (Method 1600), as described in the USEPA's March 2000 document (EPA/821/R-97/004), "Improved Enumeration Methods for the Recreational Water Quality Indicators: Enterococci and *Escherichia coli*". These laboratories were required to report exceedances of bacterial water quality standards to MDPH and local Boards of Health as soon as analyses were completed and results available.

C. DATA REPORTING

In 2003, MDPH contracted laboratories faxed both field sampling forms and analytical results for marine beaches to MDPH staff as soon as results were available. MDPH staff then entered the data on its public notification website in order to provide public notification of marine bathing beach water quality in as near real-time as possible. Bacterial exceedances and corresponding beach postings, as well as pre-emptive beach postings were faxed to MDPH by local health officials within 24 hours of occurrence. Freshwater sampling forms and analytical results were faxed or mailed to MDPH by local health officials in accordance with 105 CMR 445.000. MDPH staff entered all of these data into a database for inclusion in this annual report, as well as in support of USEPA reporting requirements under the 2003 Beach Grant. The USEPA Beach Grant mandates that MDPH must report all routine monitoring sampling data and laboratory results, as well as beach postings, electronically on an annual basis.

D. DATA VALIDATION

All data was validated and checked for completeness by MDPH personnel using faxed copies of field and laboratory reports sent in by local Boards of Health. Local Boards of Health and laboratories were contacted directly, as necessary, to resolve questions and discrepancies in the reports.

E. PUBLIC NOTIFICATION

Under Massachusetts law (M.G.L. C. 111, § 5S), the local Board of Health is required to post signs at the entrance(s) to a beach within 24 hours of being notified that the beach did not meet water quality standards. In addition, the BOH is required to notify MDPH that the beach has been posted and that standard signs have been put up at key access points to the beach within 24 hours. In 2003, using funding provided as part of the USEPA Beaches Grant, MDPH established a website for displaying sampling results and beach postings for all public, marine beaches in the state. MDPH contracted laboratories faxed both field sampling forms and laboratory results to MDPH as soon as laboratory results were available. MDPH personnel performed data entry to get this information onto the public website in near real-time. In addition, notification that the marine beach had been posted (i.e. signs put up) was sent on a standard posting form by fax to MDPH by local health officials within 24 hours of occurrence. Marine beach postings were entered into the website by MDPH personnel as soon as they were received.

F. LIMITATIONS

The ability of MDPH to provide prompt public notification of beach water quality monitoring results is limited by both the completeness and accuracy of the data reported, as well as on the consistent use of scientifically proven indicator organisms and analytical techniques. In 2003, Massachusetts achieved 100% compliance in the use of the state and federally mandated Enterococci indicator organism among public marine beaches

reporting routine monitoring results. This is an improvement over 2002 and 2001 when 99% and 98% respectively of marine beaches reported using approved indicator organisms. Additionally, MDPH provided training to local health officials in the use of proper sampling, storage and transport procedures in preparation for the 2003 bathing beach season. The use of proper and consistent sampling procedures is an important step in ensuring the quality of data reported. As a result of training, the use of standardized field sampling forms and the participation of contracted laboratories, consistency in the format and completeness of data reported continues to improve. The electronic reporting system that will be used for the 2004 data reporting will help to further improve data completeness in the reporting of some of the supporting descriptive field data such as bather density and the presence of pollution sources.

Another limitation, related to the specificity of analytical methods, is that the data are indicator-, not pathogen-, specific. As a result, the data only suggest a potential for the presence of pathogens that can cause human disease. The presence or absence of specific pathogens is not assayed. The use of indicators implies that water meeting the criteria may harbor disease-causing microorganisms and also that water considered unsafe may not carry any disease-causing microorganisms (e.g., Polo *et al.*, 1998; Moore *et al.*, 2001; Prieto *et al.*, 2001; Schindler, 2001). This is an inherent limitation of using indicators as a test of water quality, in Massachusetts and elsewhere. However, it does need to be emphasized that a substantial body of scientific research generally supports the use of these indicators as described earlier in this document (Cabelli, 1983, USEPA 1986).

The criteria developed for each indicator are set at a specific level of risk of an adverse health effect, in this case gastrointestinal (GI) illness, not at a no-risk level. The indicator limits recommended by USEPA for Enterococci in marine waters are associated with a risk level of 19 GI illnesses / 1000 swimmers (EPA 1986). Therefore, levels of indicators considered in compliance by the Massachusetts and national requirements do not imply freedom from risk of adverse health effects for the total population at risk.

Finally, acceptable levels of risk are typically determined by the incidence of gastrointestinal symptoms among swimmers compared to that for non-swimmers. It should be noted, however, that pathogens found in marine and freshwater can cause other symptoms, including respiratory, dermatologic, ophthalmologic, and constitutional. These symptoms are generally not taken into account in determining criteria for the different indicator species.

IV. RESULTS

During the 2003 bathing season, all marine and the majority of freshwater communities in Massachusetts with public and semi-public marine and/or freshwater beaches sent water quality data to MDPH. In total, MDPH received water quality data from 190 Massachusetts communities, representing 1,147 public and semi-public marine and freshwater beaches and 13,931 water samples. Private marine or private freshwater bathing beaches are beyond the scope of this report.

Summaries and analyses of the marine and freshwater bathing beach data are presented in Tables 1 – 22 and Figures 1 – 16. The data are divided by type of beach (marine vs. freshwater) to allow easy comparison to earlier reports that analyzed marine bathing beaches only (e.g., MDPH/BEHA/ETP 1997) and to accommodate the different testing criteria for the two types of beaches (see Background section). The data are analyzed according to type of beach, presence or absence of data, bather density, pollution source, bacterial indicator, frequency of testing, organization that performed testing, exceedances based on current Massachusetts criteria, and beach postings. Data are grouped either according to community, beach, or individual water sample in order to facilitate understanding and interpreting the results. For example, bather density at a given beach changes during the day and season, so it makes sense to express these data in terms of bather density at the time an individual water sample was taken. Alternatively, testing frequency only makes sense in terms of a given beach. The data are presented in tabular (Tables 1- 22), pie graph (Figures 1 – 11), and map (Figures 12 – 15) forms.

When compared to 2001, the most recent year having comparable rainfall during beach season, Massachusetts beaches showed both lower overall numbers of exceedances, 643 vs. 780 in 2001, and number of beaches having exceedances, 276 vs. 288 (Table 13 and MDPH 2001). In addition, the percent of samples in 2003 that exceeded water quality standards was lower, 4.5% (Table 12) when compared with 6% in 2001 (MDPH 2001).

A. MARINE BEACHES

During the 2003 bathing season, all of the 60 Massachusetts coastal communities with known public and semi-public marine bathing beaches submitted beach monitoring data to MDPH (Tables 3a and 4, Figure 1). It should be noted that 14%, or 10 coastal communities do not have public or semi-public marine bathing beaches (Table 3a). The marine communities in Massachusetts without public or semi-public marine bathing beaches are Rowley, Peabody, Saugus, Chelsea, Everett, Fall River, Freetown, Berkeley, Dighton and Gosnold. These 60 communities accounted for 510 public or semi-public marine bathing beaches and collected a total of 7,439 water samples that were reported to MDPH during the 2003 bathing beach season (Table 4).

The total of 510 marine beaches reflects an effort to distinguish between beaches and sampling locations beginning with the 2003 report. During 2003, 70 marine beaches reported data for multiple sampling locations due to their length or specific areas of concern such as outfalls. Hence, there are more sampling locations than actual beaches.

For example, 577 public or semi-public marine beaches were reported in 2002. In 2003, the number of marine beach locations for which samples were collected increased to 602.

Bather density data was also collected as part of routine sampling during 2003 (Table 5). Massachusetts regulations require samples to be taken within the area of greatest bather density (105 CMR 445.000). As in previous years a high percentage (64%) indicate low bather density (0-10 bathers on the beach) during sampling. This can largely be attributed to samples being taken in off-peak hours for swimming. More than half of samples taken at marine beaches were obtained either before 10:00 am or after 4:00 pm (Table 22). GPS surveys of marine beaches undertaken by MDPH in 2003 and observations by MDPH beach inspectors confirm that samples are being taken within the area of greatest bather density.

With the passage of the Massachusetts Beaches Act in 2000, the state adopted the USEPA recommended Enterococci as the standard indicator for water quality monitoring at marine beaches. In 2003, marine beaches in Massachusetts universally adopted the use of Enterococci as an indicator organism (Table 8). The majority of water samples taken at each of these beaches were tested for Enterococci. Of the 7,439 marine samples taken, four samples were tested for other indicator organisms. The use of MDPH contracted labs for processing public, marine beach water samples likely played a role in achieving uniform compliance with the MDPH regulation, along with trainings conducted for local health officials in June 2003 in Wareham and Danvers and additional guidance and background information provided by mail.

The number of marine beach postings increased from 101 in 2002 to 148 in 2003 in Massachusetts. The total number of exceedances of the marine water quality standard (104 cfu/100ml Enterococcus) also increased from 184 in 2002 to 310 in 2003 in Massachusetts (Tables 12-14). Several factors are likely involved. From 2002 to 2003, both the number of locations sampled (577 vs. 602) and the number of samples taken (6,743 vs. 7,439) increased. In addition, rainfall amounts at many Massachusetts beaches were elevated during the summer of 2003, as compared with the summer of 2002 (Tables 19-20). The number of marine beach postings also increased in 2003 (148 vs 101 in 2002), reflecting the increased sampling and rainfall.

Public and semi-public marine beaches in Massachusetts were tested more frequently in 2003 than in past years, with 98% tested daily, weekly or twice per week (Table 10). In 2002, less than 96% of marine beaches were tested that often. Local health departments continue to play a large role in the sampling process, accounting for 42% of samples reported to MDPH (Table 11). MDPH contract laboratories and DCR performed the remainder of sampling at marine beaches during 2003. On Martha's Vineyard, volunteers trained by the Dukes County Testing Laboratory performs sampling. On Cape Cod, Barnstable County Health Department Laboratory personnel perform sampling.

B. FRESHWATER BEACHES

During the 2003 bathing season, 157 of the 197 Massachusetts communities with known public and semi-public freshwater bathing beaches submitted beach monitoring data to

MDPH (Tables 3, 4, 18 and Figure 2). It should be noted that an additional 121 communities in Massachusetts have no known public or semi-public bathing beaches and 33 have marine beaches only (Tables 1, 18). These 157 communities contain 637 public or semi-public freshwater bathing beaches and collected a total of 6,492 freshwater samples that were reported to MDPH during the 2003 bathing beach season (Table 4). The 40 communities believed to have freshwater bathing beaches that did not submit monitoring data in 2003 will be targeted for outreach in 2004.

In terms of bather density, the data look similar to that of marine beaches, with a high percentage (56%) indicating low bather density (0-10 bathers on the beach) during sampling. Caution should be exercised in interpreting these results, as 40% of samples did not indicate bather density. In addition, nearly half of samples taken at marine beaches were obtained during non-peak bathing hours, either before 10:00 am or after 4:00 pm (Table 22). Thus, some results may be biased low.

In 2003, the majority of freshwater beaches (79%) in Massachusetts used *E. coli* as an indicator organism (Table 8). Another 20% used Enterococci. Only 5 beaches in 3 communities continued to test exclusively for Fecal Coliform (Table 9). These communities will be targeted for outreach for the 2004 season.

The number of exceedances of freshwater water quality standards (235 cfu/100ml *E. coli* and 61 cfu/100ml Enterococcus) increased from 263 in 2002 to 333 in 2003 in Massachusetts (Table 12). Again, increased rainfall was a likely factor (Tables 19, 20). However, unlike the marine beaches, the number of freshwater samples collected and reported was only slightly higher in 2003 (6,492 samples vs 6,473 in 2002). In addition, postings reported to MDPH declined in 2003 (103 vs. 138 in 2002). This may reflect a need for increased awareness of Massachusetts beach water quality reporting requirements among health departments of freshwater communities. Efforts that were made by MDPH staff to obtain posting information included directly contacting communities both during and after beach season to explain regulations and to provide standardized reporting forms, as well as making both the forms and regulations available for download from the MDPH website. MDPH also provided training sessions in Wareham and Danvers for local health officials.

Public and semi-public freshwater beaches in Massachusetts were also tested more frequently in 2003 than in the previous year, with 97% tested daily, weekly or twice per week (Table 10). In 2002, 95% of marine beaches were tested that often. At freshwater beaches, local health departments were responsible for a higher percentage of samples than at marine beaches, accounting for 54% of samples reported to MDPH (Table 11). Contract laboratories and the Massachusetts Department of Conservation and Recreation performed the remainder of sampling at freshwater beaches during 2003.

V. DISCUSSION

A. ANALYSIS OF RESULTS

In 2003, overall MDPH continued to see improvements in the number of communities complying with bathing beach water quality reporting requirements. The use of approved indicator organisms for both freshwater and marine beaches also increased in 2003 at 99.7%, compared with 99.1 in 2002 (Table 8). Some compliance figures showed improvement in 2003, however this was not the case for water quality. Both the number of beach postings and the number of samples exceeding regulatory limits increased from 2002 to 2003 in Massachusetts. A number of factors are likely to be involved in the increase. Both the number of sampling locations (1236¹ vs 1150 in 2002) and the number of samples tested (13,931 vs 13,216 in 2002) increased significantly in 2003 (Table 4).

The amount of rainfall at most beaches in Massachusetts was also significantly higher during the 2003 beach season than in 2002. Tables 19 and 20 show rainfall totals and deviation from the norm for the months of June, July and August, from 2001 through 2003. The 2002 beach season was unusually dry in Massachusetts. Stormwater runoff associated with wet weather has been shown to be a significant source of sewage contamination at bathing beaches (*Cabelli et al, 1982; Cabelli 1989; Preuss 1998; Gerba 2000; Schindler 2001*). Communities, however, are beginning to address this in response to USEPA's new stormwater regulations. Hence, future improvements are expected to occur.

Finally, another concern with water quality continues to be the presence of known pollution sources on or near beaches. Of the 510 public or semi-public marine beaches, 137 incurred at least one bacterial exceedance (Table 13). Of the 310 marine beach samples that exceeded regulatory limits, 103 occurred near locations identified as pollution sources during the MDPH GPS survey of marine beaches conducted in 2003 (mostly outfall pipes). Table 21 shows the number of exceedances both near and away from identified outfalls. In 2003, sample sites having identified pollution sources nearby incurred bacterial exceedances in 8% of samples taken, whereas sampling locations with no known pollution sources nearby incurred exceedances in 3% of samples taken. The 103 exceedances near pollution sources were distributed among 50 separate beaches and the 207 exceedances near no known pollution sources encompassed 87 beaches.

Through an improved understanding of the relationships between rainfall and bacterial exceedances as well as pollution sources and exceedances, MDPH and local health officials have enhanced protection of the public health using pre-emptive closures and timely monitoring.

¹ Note: based on 602 marine sampling sites at 510 beaches

B. FUTURE PLANS

Direct Web-based Reporting

In 2004 MDPH contracted laboratories, local Boards of Health and others will perform data entry to the electronic, web-based public notification website. The system will automatically generate beach postings on the website when samples are submitted that exceed accepted water quality standards. Display of posting on the public pages will occur twice per day, at 9:30 am and at 12:30 pm. Enhancements soon to be completed will allow local health officials to be able to see postings shortly before the public to give them an opportunity to post beaches and prepare for public inquiries. A history of postings will be maintained on the website to facilitate analysis of the data for the 2004 Annual Report. This will provide more accurate recordkeeping so that trends can be analyzed in future reports. Data entry pages on the website will be enhanced to improve usability for the laboratories and local Boards of Health. These enhancements will include improved use of selection lists, validation of data entered and immediate feedback to improve the quality and consistency of data entered into the system.

Laboratory Audits

MDPH will conduct Quality Assurance / Quality Control audits of its routine monitoring contract laboratories to ensure good laboratory practices for the laboratory analysis of water quality samples. MDPH will perform the audits in consultation with and in accordance with the guidelines developed by the Massachusetts Department of Environmental Protection's Wall Experiment Station.

Tiered Monitoring

MDPH will facilitate or conduct sanitary surveys in support of Tiered Monitoring Plans and variances during 2004. At such time as the tiered monitoring plan is adopted at specific beaches, a "high" priority beach will receive the most frequent water quality sampling and analysis, a minimum of once per week. Such a beach might be one with high bather volume, high frequency or percentage of exceedances, problematic sources of pollution, or a combination of these factors. A "medium" priority beach will be sampled once per week and will still be required to meet water quality standards. Beaches that are tiered "medium" can have any of the factors listed for "high" priority beaches but with less frequency or intensity of any of the three criteria. A "low" priority beach is one that is most pristine. Low priority beaches are eligible for less frequent testing, as infrequently as every 30 days under 105 CMR 445.000, if the local health department receives a testing variance. Data from the 2003 bathing season will be incorporated into the existing tiered monitoring plan to update the published classifications.

Complete Flagship Beach Projects

In 2004, MDPH hopes to complete the Flagship Beach projects at Willow's Pier Beach in Salem, Wollaston Beach in Quincy and Ryder Street Beach in Provincetown. Detailed sanitary surveys of the beaches will be completed, identifying all possible sources of contamination at these beaches. In addition, focused sampling studies will be completed at each of the beaches. Results will be summarized in a report.

Training

MDPH plans to continue its support of communities' water quality monitoring efforts by continuing to offer training sessions in current regulations, sampling techniques and the use of standardized reporting forms. MDPH also hopes to extend its training efforts to freshwater communities. In addition, MDPH intends to conduct training in performing sanitary surveys to further its goal of completing a Tiered Monitoring Program. MDPH will also provide training in the use of the MDPH website for entering water quality monitoring data to contract laboratories and other organizations performing data entry during the coming beach season.

VI. SUMMARY

This report summarizes beach monitoring and testing data from Massachusetts public and semi-public marine and freshwater bathing beaches in the 2003 season. In total, 190 communities, 1147 beaches, and 13,931 water samples were available for analysis. In 2003, the state of beaches in Massachusetts continued to show improvements in terms of the number communities reporting data and in the number of marine beaches reporting data. In addition, universal compliance with the use of standard indicator bacteria at marine beaches has helped to improve the quality and consistency of the data being reported. While exceedances of regulatory limits and numbers of beach postings increased in 2003 from 2002, the latter was a year that demonstrated below average rainfall. When compared to 2001, the most recent year having comparable rainfall during beach season, Massachusetts beaches showed lower overall numbers of exceedances, including numbers of beaches having exceedances and a lower percent of samples exceeding water quality standards.

This report highlights that better compliance with posting requirements continues when bacterial exceedances occur at marine beaches. MDPH continues to provide training and information to local communities in an effort to improve compliance in this area. MDPH continues to make improvements in its public notification website to make sure this information is available to the public as soon as it becomes available. In addition, MDPH is continuing to focus efforts on the most vulnerable beaches through its Tiered Monitoring Plan and flagship projects.

VII. ACKNOWLEDGMENTS

This study would not have been possible without the efforts and cooperation of the local and county health departments in the Massachusetts communities that are included here. MDPH also received much assistance from many local and regional organizations, including the DCR-DUPR and DCR-DSPR. Most recently, MDPH received technical support from Digital Health, Inc. and Applied Geographics, Inc. in order to make data reporting more accurate and efficient. Finally, we are grateful to the USEPA for providing financial support for this effort. USEPA Beach Grant funds support much of our efforts in areas related to public marine beach data reporting and notification, including the public notification website, laboratory analysis of routine monitoring samples, the Flagship beach program, training and enforcement activities.

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IX. TABLES

Table 1: All Massachusetts communities grouped by the presence and/or absence of marine and freshwater public and semi-public bathing beaches.

Type of community	Number (#)	Percentage (%)
Marine beach only	33	9
Freshwater beach only	170	48
Marine and freshwater beaches	27	8
No beaches	121	35
Total	351	100.0

Table 2: All Massachusetts communities grouped according to the presence or absence of data for marine or freshwater public and semi-public bathing beaches.

Type of community	Number (#)	Percentage (%)
Marine or freshwater beach, with data ¹	190	54
Marine or freshwater beach, without data	40	11
No beaches	121	34
Total	351	~100

1. The data included in this report were submitted from Massachusetts' communities through 3/31/04 for the 2003 bathing season.

Table 3a: Water quality testing at marine and freshwater public and semi-public bathing beaches in Massachusetts, grouped by community, for the years 2003, 2002, 2001, 1996, and 1995.

Coastal communities										
Type of community	2003 ¹		2002		2001 ¹		1996		1995	
	#	%	#	%	#	%	#	%	#	%
Coastal communities with marine bathing beaches	60	86	59	84	59	84	60	86	60	86
Coastal communities with marine bathing beaches for which data were obtained	60	100	59	100	58	98	53	88	52	87
Coastal communities with marine bathing beaches for which no data were obtained	0	0	0	0	1	2	7	12	8	13
Coastal communities without marine bathing beaches	10	14	11	16	11	16	10	14	10	14
Total number of coastal communities	70	100	70	100	70	100	70	100	70	100

Table 3b: Water quality testing at freshwater public and semi-public bathing beaches in Massachusetts, grouped by community, for the years 2003, 2002, 2001, 1996, and 1995.

All cities/towns										
Type of community	2003		2002		2001		1996		1995	
	#	%	#	%	#	%	#	%	#	%
Communities with freshwater bathing beaches	197	56	194	55	175	50	N/A	N/A	N/A	N/A
Communities with freshwater bathing beaches for which data were obtained	157	80	158	81	145	83	N/A	N/A	N/A	N/A
Communities with freshwater bathing beaches for which no data were obtained	40	20	36	19	30	17	N/A	N/A	N/A	N/A
Communities without freshwater bathing beaches	154	44	157	45	176	50	N/A	N/A	N/A	N/A
Total number of communities	351	100	351	100	351	100	N/A	N/A	N/A	N/A

1. The number of communities with marine beaches was adjusted as the inventory became more complete over time.
2. The number of communities with freshwater beaches was adjusted as the inventory became more complete over time.

Table 4: Water quality testing at marine and freshwater public and semi-public bathing beaches in Massachusetts in 2003, grouped by community, beach, and sample.

Type of community	# communities (total)	# communities with data	# beaches ¹ tested	# samples
Communities with marine bathing beaches	60	60	510	7439
Communities with freshwater bathing beaches	197	157	501	6492
Total	230 ³	190 ^{2,3}	1011 ²	13,931 ²

1. Note that this table does not include the number of beaches that were not tested, as data were not compiled to accurately determine this number.
2. These numbers represent the total number of communities, beaches, and samples, respectively, for which there are data in 2003.
3. The total number of communities is less than the sum of the number of communities with marine beaches and those with freshwater beaches because there are 27 communities that have both marine and freshwater bathing beaches (see Table 1).

Table 5: Bather density at marine and freshwater public and semi-public bathing beaches in Massachusetts in 2003, at times when samples were taken.

Marine beaches		
Bather Density (# people)	# Samples	%
0-10	4,735	64
10-20	197	3
20-50	156	2
>50	44	1
Not indicated	2,307	31
Total	7,439	~100
Freshwater beaches		
Bather Density (# people)	# Samples	%
0-10	3,653	56
10-20	142	2
20-50	80	1
>50	38	1
Not indicated	2,579	40
Total	6,492	100

Table 6: Reported existence of open or obvious sources of pollution that might affect the water quality at marine and freshwater public and semi-public bathing beaches in Massachusetts in 2003, reported during routine sampling¹.

Marine beaches		
Pollution source	# Samples	%
Yes	114	2
No	0	0
Not indicated	7,325	98
Total	7,439	100
Freshwater beaches		
Pollution source	# Samples	%
Yes	268	4
No	0	0
Not indicated	6,224	96
Total	6,492	100

¹. Pollution sources noted on field sampling forms during routine monitoring

Table 7: Reported sources of pollution for marine and freshwater public and semi-public bathing beaches in Massachusetts in 2003 for which a pollution source was specified.

Marine Beaches		
Sources	# Beaches	%
Boat	66	58
Wildlife	47	41
Other	1	1
Total	114	100
Freshwater Beaches		
Sources	# Beaches	%
Boat	0	0
Wildlife	268	100
Other	0	0
Total	268	100

Table 8: Water quality bacterial indicators used to test marine and freshwater public and semi-public bathing beaches in Massachusetts in 2003, grouped by sample.

Marine beaches		
Indicator ¹	# Samples	%
Enterococcus	7,435	100
<i>E. coli</i>	3	0
Fecal coliform	1	0
Total coliform	0	0
Fecal streptococcus	0	0
Not indicated	0	0
Total	7,439	100
Freshwater beaches		
Indicator ²	# Samples	%
Enterococcus	1,303	20
<i>E. coli</i>	5,145	79
Fecal coliform	44 ³	1
Total coliform	0	0
Fecal streptococcus	0	0
Not indicated	0	0
Total	6,492	100

1. Massachusetts state guidelines indicate that Enterococcus be used to test marine beaches for potential bacterial contamination.
2. Massachusetts state guidelines indicate that Enterococcus or *E. coli* be used to test freshwater beaches for potential bacterial contamination.
3. Samples from only 5 freshwater beaches in 3 communities

4. **Table 9:** Water quality bacterial indicators or combinations of indicators used to test marine and freshwater public and semi-public bathing beaches in Massachusetts in 2003, grouped by beach.

Marine beaches		
Indicator(s)	# Beaches	%
Enterococcus only	507	99
<i>E. coli</i> only	0	0
Fecal coliform only	0	0
Total coliform only	0	0
Enterococcus and <i>E. coli</i>	2	0
Enterococcus and Fecal coliform	1	0
Enterococcus and Total coliform	0	0
Enterococcus, Fecal coliform, and Total coliform	0	0
Not indicated	0	0
Total	510	~100
Freshwater beaches		
Indicator(s)	# Beaches	%
Enterococcus only	66	13
<i>E. coli</i> only	405	81
Fecal coliform only	5	1
Total coliform only	0	0
Enterococcus and <i>E. coli</i>	24	5
Enterococcus and Fecal coliform	0	0
Enterococcus and Total coliform	0	0
<i>E. coli</i> and Fecal coliform	1	0
<i>E. coli</i> and Total coliform	0	0
<i>E. coli</i> and Fecal streptococcus	0	0
Fecal coliform and total coliform	0	0
Enterococcus, <i>E. coli</i> , and Fecal coliform	0	0
Enterococcus, <i>E. coli</i> , and Total coliform	0	0
<i>E. coli</i> , Fecal coliform, and Total coliform	0	0
<i>E. coli</i> , Fecal coliform, Total coliform, and Fecal streptococcus	0	0
Fecal coliform and Fecal streptococcus	0	0
Not indicated	0	0
Total	501	~100

1. Each of the rows in this table is independent of the others (e.g., the number of beaches tested for Enterococcus and *E. coli* together is not included in the number of beaches tested for Enterococcus only).
2. Beaches that use multiple indicators usually do not use them on a consistent basis (e.g., water samples on a given date are tested with one indicator, while those tested on a different date are tested with another indicator).

Table 10: Frequency of water quality testing at marine and freshwater public and semi-public bathing beaches in Massachusetts in 2003, grouped by beach and frequency.

Marine beaches		
Test frequency	# Beaches	%
Daily	8	2
Twice per week	2	0
Weekly	492	96
Twice per month	0	0
Monthly	0	0
Three times	1	0
Two times	1	0
One time	6	1
Total	510	~100
Freshwater beaches		
Test frequency	# Beaches	%
Daily	0	0
Twice per week	5	1
Weekly	475	96
Twice per month	0	0
Monthly	0	0
Three times	13	2
Two times	3	0
One time	5	1
Total	501	100

Table 11: Groups, agencies, or individuals who collected water samples at marine and freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Marine beaches		
Testing organization	# Samples	%
Local Health Department	3,133	42
Department of Conservation/ Division of Urban Parks and Recreation (DCR-DUPR))	1,035	14
Department of Conservation/Division of State Parks and Recreation (DCR-DSPR)	82	1
Outside lab	3,180	43
Other	9	0
Total	7,439	100
Freshwater beaches		
Testing organization	# Samples	%
Local Health Department	3,496	54
Department of Conservation/ Division of Urban Parks and Recreation (DCR-DUPR))	127	2
Department of Conservation/Division of State Parks and Recreation (DCR-DSPR)	823	13
Outside lab	2,046	32
Other	0	0
Total	6,492	~100

Table 12: The number of samples in which the measured Enterococcus concentration (marine beaches) or Enterococcus or *E. coli* concentration (freshwater beaches) exceeded their respective water quality criteria at public and semi-public bathing beaches in Massachusetts in 2003.

Marine beaches		
Concentration	# Samples	%
Exceedance ¹	310	4
Non-exceedance	7071	95
Indeterminant ¹	58	1
Total	7,439	100
Freshwater beaches		
Concentration	# Samples	%
Exceedance ¹	334	5
Non-exceedance	5,961	92
Indeterminant ²	197	3
Total	6,492	100

1. For marine beaches, Enterococcus is the indicator species. A sample is said to be in exceedance if the number of colony forming units (CFU) / 100 ml is greater than 104 for a single sample or greater than 35 for the average of 5 samples over a 30-day period. For freshwater beaches, either Enterococcus or *E. coli* can be used as indicator species. For Enterococcus, a sample is said to be in exceedance if the number of CFU / 100 ml is greater than 61 for a single sample or greater than 33 for the average of at least 5 samples over a 30-day period. For *E. coli*, a sample is said to be in exceedance if the number of CFU / 100 ml is greater than 235 for a single sample or greater than 126 for the average of at least 5 samples over a 30-day period.

2. Indeterminant means that an indicator other than those recommended by current guidelines was used, no indicator was reported, or no level was reported.

Table 13: The number of beaches in which at least one measured Enterococcus concentration (marine beaches) or at least one Enterococcus or *E. coli* concentration (freshwater beaches) exceeded their respective water quality criteria at public bathing beaches in Massachusetts in 2003.

	# beaches with at least one exceedance	Total # beaches reporting samples	%
Marine beaches	137	510	27
Freshwater beaches	139	501	28

Table 14: The number of exceedances at marine and freshwater public and semi-public bathing beaches in Massachusetts in 2003, grouped by indicator species.

Marine beaches			
Indicator	Total # Samples collected	Total # samples exceeding criterion	% samples exceeding criterion
Enterococcus	7,435	310	4
E. coli	3	N/A	N/A
Fecal coliform	1	N/A	N/A
Total coliform	0	N/A	N/A
Fecal streptococcus	0	N/A	N/A
Not indicated	0	N/A	N/A
Total	7,439	311	4
Freshwater beaches			
Indicator	Total # Samples collected	Total # samples exceeding criterion	% samples exceeding criterion
Enterococcus	1,303	160	12
E. coli	5,145	174	3
Fecal coliform	44	N/A	N/A
Total coliform	0	N/A	N/A
Fecal streptococcus	0	N/A	N/A
Not indicated	0	N/A	N/A
Total	6,492	334	5

Table 15: The number of exceedances and postings at marine and freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Marine beaches	
Exceedances, total (Enterococcus)	310
Postings, total ¹	148
Postings, Enterococcus	134
Postings, Preemptive Rainfall	13
Postings, Oil Spill ²	1
Freshwater beaches	
Exceedances, total	333
Exceedances, Enterococcus	159
Exceedances, E. coli	174
Postings, total ¹	103
Postings, Enterococcus	58
Postings, E. coli	42
Postings, Possible Parasite ³	1
Postings, Lack of Testing	2

1. Total Postings does not necessarily equal total exceedances because some tests that resulted in exceedance may have occurred while the beach was closed, or beach closings covered multiple parts of a beach that were counted as separate beaches in this report.

2. At Cockle Cove in Chatham on 8/12/2003

3. At Long Cove Pond, West Tisbury on 7/16/2003

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Aquinnah (formerly Gay Head)	Lobsterville	Weekly	Enterococci	8	1	390	1-74	
Aquinnah (formerly Gay Head)	Moshup Beach	Weekly	Enterococci	8	1	156	1-18	
Aquinnah (formerly Gay Head)	Philbin Beach	Weekly	Enterococci	9	1	178	1-30	
Aquinnah (formerly Gay Head)	Red Beach	Weekly	Enterococci	8	1	830	2-22	
Barnstable	Bone Hill	Weekly	Enterococci	14			2-18	
Barnstable	Bridge Street	Weekly	Enterococci	13	1	150	2-24	1
Barnstable	Cordwood Road	Weekly	Enterococci	13	1	386	2-40	2
Barnstable	Cotuit Bay Shores Association	Weekly	Enterococci	13			2-40	
Barnstable	Covell's	Weekly	Enterococci	14			2-50	
Barnstable	Craigville	Weekly	Enterococci	16			2-30	
Barnstable	Crocker's Neck	Weekly	Enterococci	16			2-64	
Barnstable	Cross Street	Weekly	Enterococci	13			2-4	
Barnstable	Dowdes	Weekly	Enterococci	13			2-20	
Barnstable	East (Town) Beach	Weekly	Enterococci	13	1	400	2-32	1
Barnstable	Estey Avenue	Weekly	Enterococci	13			2-72	
Barnstable	Grand Isle Drive	Once	Enterococci	1			2-2	
Barnstable	Indian Trail	Weekly	Enterococci	13			1-24	
Barnstable	Kalmus Ocean	Weekly	Enterococci	13			2-62	
Barnstable	Kalmus Yacht	Weekly	Enterococci	14			2-36	
Barnstable	Kennedy Memorial	Weekly	Enterococci	12			2-42	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Barnstable	Keyes	Weekly	Enterococci	13			2-96	
Barnstable	Little River Road	Weekly	Enterococci	15			2-38	
Barnstable	Loops	Weekly	Enterococci	13	1	128	2-6	1
Barnstable	Millway	Weekly	Enterococci	13			2-60	
Barnstable	Oregon	Weekly	Enterococci	15			2-24	
Barnstable	Oyster Harbors Club	Weekly	Enterococci	14			2-8	
Barnstable	Oyster Place	Weekly	Enterococci	12	1	400	2-34	1
Barnstable	Prince Cove	Weekly	Enterococci	17	2	116-120	6-76	3
Barnstable	Ropes	Weekly	Enterococci	13	3	106-400	2-36	3
Barnstable	Sandy Neck	Weekly	Enterococci	12			2-30	
Barnstable	Scudder Lane	Weekly	Enterococci	13	1	210	2-73	1
Barnstable	Seaside Park Improvement Association	Weekly	Enterococci	13			2-16	
Barnstable	Veterans	Weekly	Enterococci	14			2-16	
Barnstable	Wianno Avenue	Weekly	Enterococci	14			2-32	
Barnstable	Wianno Club (Salt)	Weekly	Enterococci	13			2-10	
Beverly	Brackenbury	Weekly	Enterococci	10	1	2400	2-95	1
Beverly	Dane Street (bathhouse)	Weekly	Enterococci	14	2	410-770	5-70	2
Beverly	Dane Street (jetty)	Weekly	Enterococci	10			2-89	2
Beverly	Dane Street (outfall)	Weekly	Enterococci	11	1	2200	8-75	
Beverly	Goat Hill	Weekly	Enterococci	11	1	310	8-82	1
Beverly	Independence Park	Weekly	Enterococci	11	1	190	2-52	
Beverly	Lynch Park	Weekly	Enterococci	10			6-48	
Beverly	Mingo	Weekly	Enterococci	8	1	300	5-72	1
Beverly	Obear Park	Weekly	Enterococci	10			12-98	
Beverly	Rice	Weekly	Enterococci	11			2-56	1

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Beverly	Sandy Point	Weekly	Enterococci	22	1	580	2-94	1
Beverly	West	Weekly	Enterococci	10			2-44	
Beverly	Woodbury	Weekly	Enterococci	12	1	156	2-72	1
Boston	Carson Beach (bathhouse)	Daily	Enterococci	56	3	145-2200	1-100	9
Boston	Carson Beach (I St.)	Daily	Enterococci	57	5	165-445	2-75	
Boston	City Point Beach @ Point	Daily	Enterococci	56	5	108-360	1-78	6
Boston	Constitution (North site)	Daily	Enterococci	57	4	170-650	2-98	
Boston	Constitution (rec center)	Daily	Enterococci	57	4	118-1100	2-86	3
Boston	Constitution (other)	Daily	Enterococci	57	3	110-650	1-90	
Boston	Lovell's Island	Weekly	Enterococci	9			1-8	
Boston	M Street Beach	Daily	Enterococci	56	5	122-700	2-95	3
Boston	Malibu	Twice Per Week	Enterococci	20	7	136-830	6-95	4
Boston	Pleasure Bay	Daily	Enterococci	56	1	420	2-100	3
Boston	Savin Hill	Twice Per Week	Enterococci	19	4	122-590	4-92	4
Boston	Tenean	Daily	Enterococci	57	13	112-1220	3-104	10
Bourne	Barlows Landing	Weekly	Enterococci	12			1-41	
Bourne	Briarwood Marine and Science	Weekly	Enterococci	12			2-40	
Bourne	Cataumet	Weekly	Enterococci	13			2-8	
Bourne	Cedar Point Association	Weekly	Enterococci	13			1-6	
Bourne	Electric Avenue	Weekly	Enterococci	15	1	176	1-28	1
Bourne	Gray Gables	Weekly	Enterococci	12			2-14	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Bourne	Hideaway Village Association	Weekly	Enterococci	13			2-28	
Bourne	Monument	Weekly	Enterococci	11			2-16	
Bourne	Patiusset Beach	Weekly	Enterococci	14			2-56	
Bourne	Pocasset Beach Improvement Assn	Weekly	Enterococci	13			2-28	
Bourne	Sagamore	Weekly	Enterococci	12			2-9	
Bourne	Scenic Park	Weekly	Enterococci	9			2-14	
Bourne	Scraggy Neck Recreation Assn	Weekly	Enterococci	12			2-28	
Bourne	Tahanto Associates	Weekly	Enterococci	13			2-34	
Bourne	Wings Neck Trust Assn (North Beach)	Weekly	Enterococci	9			2-2	
Bourne	Wings Neck Trust Assn (South Beach)	Weekly	Enterococci	13			2-4	
Braintree	Fore River Smith Beach	Weekly	Enterococci	11	1	144	8-104	1
Brewster	Breakwater Landing	Weekly	Enterococci	8			1-92	
Brewster	Cape Cod Sea Camps Bay	Three times	Enterococci	3			2-6	
Brewster	Crosby Landing	Weekly	Enterococci	8			2-6	
Brewster	Ellis Landing	Weekly	Enterococci	8			2-62	
Brewster	Linnell Landing	Weekly	Enterococci	8			2-22	
Brewster	Paines Creek	Weekly	Enterococci	8			2-50	
Brewster	Point of Rocks	Weekly	Enterococci	8			2-38	
Brewster	Robbins Hill	Weekly	Enterococci	8			2-16	
Brewster	Saints Landing	Weekly	Enterococci	8			2-20	
Chatham	Bucks Creek	Weekly	Enterococci	15			2-92	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Chatham	Chatham Bars Inn	Weekly	Enterococci	14			2-23	
Chatham	Cockle Cove	Weekly	Enterococci	15			2-93	
Chatham	Cockle Cove Creek (parking lot)	Weekly	Enterococci	15	6	115-592	3-82	1
Chatham	Cockle Cove Creek (Ridgevale bridge)	Weekly	Enterococci	13	3	135-180	2-80	1
Chatham	Forest Beach Road	Weekly	Enterococci	15	1	188	2-32	1
Chatham	Hardings (East)	Weekly	Enterococci	14			2-32	
Chatham	Hardings (West)	Weekly	Enterococci	13			2-32	
Chatham	Hawthorne	Weekly	Enterococci	14			2-30	
Chatham	Jacknife Harbor	Weekly	Enterococci	13			2-33	
Chatham	Lighthouse	Weekly	Enterococci	14			2-32	
Chatham	Oyster Pond	Weekly	Enterococci	14			2-28	
Chatham	Pleasant Street	Weekly	Enterococci	14			2-35	
Chatham	Ridgevale	Weekly	Enterococci	14			2-35	
Chatham	Scaterree	Weekly	Enterococci	13			2-32	
Chilmark	Great Rock Bight	Weekly	Enterococci	8			1-98	
Chilmark	Menemsha	Weekly	Enterococci	20			0-26	
Chilmark	Ocean @ Chilmark Pond Preserve	Weekly	Enterococci	13	1	350	1-28	
Chilmark	Ocean @ Lucy Vincent Beach	Weekly	Enterococci	20	1	130	0-14	
Chilmark	Pond @ Lucy Vincent Beach	Weekly	Enterococci	13	1	350	0-64	
Chilmark	Squibnocket Beach	Weekly	Enterococci	18			0-6	
Cohasset	Bassing's (Sailing Club)	Weekly	Enterococci	12			2-70	1
Cohasset	Black Rock	Weekly	Enterococci	12			2-62	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Cohasset	Little Harbor	Weekly	Enterococci	13	1	260	2-104	
Cohasset	Sandy	Weekly	Enterococci	13			2-64	
Cohasset	Sandy Cove	Weekly	Enterococci	12			2-98	
Cohasset	Yacht Club	Weekly	Enterococci	6			4-80	
Danvers	Sandy Beach (East)	Weekly	Enterococci	16	1	9200	4-66	
Danvers	Sandy Beach (West)	Weekly	Enterococci	16	1	3300	6-92	
Dartmouth	Anthony's	Weekly	Enterococci	11			1-2	
Dartmouth	Apponagansett Town Beach	Weekly	Enterococci	10			1-3	
Dartmouth	Barney's Joy	Weekly	Enterococci	5			1-8	
Dartmouth	Bayview	Weekly	Enterococci	23			1-44	
Dartmouth	Demarest Lloyd	Weekly	Enterococci	11			2-42	
Dartmouth	Hidden Bay	Weekly	Enterococci	10			1-11	
Dartmouth	Jones Town Beach	Weekly	Enterococci	11			1-37	
Dartmouth	Moses Smith Creek	Weekly	Enterococci	10			1-50	
Dartmouth	Nonquitt	Weekly	Enterococci	10			1-5	
Dartmouth	Oak Hill Shores	Weekly	Enterococci	10			1-4	
Dartmouth	Round Hill	Weekly	Enterococci	10			1-10	
Dartmouth	Salter's Point East	Weekly	Enterococci	10			1-20	
Dartmouth	Salter's Point South	Weekly	Enterococci	10			1-8	
Dennis	Bayview	Weekly	Enterococci	23			1-44	
Dennis	Chapin Memorial	Weekly	Enterococci	15	1	134	2-92	1
Dennis	Cold Storage	Weekly	Enterococci	13			2-52	
Dennis	Corporation	Weekly	Enterococci	12			1-64	
Dennis	Follins Pond	Weekly	E. coli	2			4-4	
Dennis	Follins Pond	Weekly	Enterococci	11			2-88	
Dennis	Glendon	Weekly	Enterococci	13			2-58	
Dennis	Haigis	Weekly	Enterococci	13			1-26	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Dennis	Harborview	Weekly	Enterococci	13	1	296	2-32	1
Dennis	Howes	Weekly	Enterococci	12			2-25	
Dennis	Inman Road	Weekly	Enterococci	14	1	110	2-71	1
Dennis	Mayflower	Weekly	Enterococci	13			2-56	
Dennis	Raycroft	Weekly	Enterococci	13			2-24	
Dennis	Sea Street	Weekly	Enterococci	14			2-21	
Dennis	Sea Street East	Weekly	Enterococci	13			2-8	
Dennis	South Village	Weekly	Enterococci	13			2-10	
Dennis	Sullivan (Depot St.)	Weekly	Enterococci	13			2-24	
Dennis	Trotting Park	Weekly	Enterococci	13			1-48	
Dennis	West Dennis (residential)	Weekly	Enterococci	14	1	130	2-44	1
Dennis	West Dennis (West)	Weekly	Enterococci	13			2-8	
Dennis	West Dennis (West of snackbar)	Weekly	Enterococci	13			2-76	
Duxbury	Duxbury	Weekly	Enterococci	13			2-74	
Duxbury	Hardin Hill	Weekly	Enterococci	13	4	150-185	2-94	1
Duxbury	Howlands Landing	Weekly	Enterococci	12	5	130-840	2-92	
Duxbury	Landing Road	Weekly	Enterococci	12	3	580-880	8-62	
Duxbury	Residents Beach	Weekly	Enterococci	13			2-66	
Duxbury	Shipyard Lane	Weekly	Enterococci	13	2	112-265	2-86	1
Duxbury	West End	Weekly	Enterococci	14	2	380-630	2-64	
Eastham	Bay View Road	Weekly	Enterococci	14			2-76	
Eastham	Boat Meadow	Weekly	Enterococci	16	3	110-128	2-26	
Eastham	Campground (1)	Weekly	Enterococci	1	1	248	4-4	
Eastham	Campground (2)	Weekly	Enterococci	14			2-70	
Eastham	Coast Guard (1)	Weekly	Enterococci	7			1-2	
Eastham	Coast Guard (2)	Weekly	Enterococci	6			2-2	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Eastham	Cole Road	Weekly	Enterococci	13			2-90	
Eastham	Cook's Brook	Weekly	Enterococci	26	9	130-405	2-92	
Eastham	Cook's Brook	Weekly	Fecal Coliform	1			2-2	
Eastham	Dyer Prince	Weekly	Enterococci	13			2-40	
Eastham	First Encounter	Weekly	Enterococci	27			2-52	
Eastham	Kingsbury	Weekly	Enterococci	14			2-50	
Eastham	Nauset Light (1)	Weekly	Enterococci	8			2-14	
Eastham	Nauset Light (2)	Weekly	Enterococci	8			2-4	
Eastham	Nauset Light (3)	Weekly	Enterococci	8			2-12	
Eastham	Sunken Meadow	Weekly	Enterococci	13			2-54	
Eastham	Thumpertown	Weekly	Enterococci	13			2-72	
Eastham	Town Cove	Weekly	Enterococci	15			2-42	
Edgartown	Bend in the Road	Weekly	Enterococci	10			1-20	
Edgartown	Chappy Point Beach	Weekly	Enterococci	7			1-30	
Edgartown	East Beach (Chappy)	Weekly	Enterococci	7			1-44	
Edgartown	Felix Neck	Weekly	Enterococci	4			2-8	
Edgartown	Joseph Sylvia State Beach (big bridge)	Weekly	Enterococci	8			1-54	
Edgartown	Joseph Sylvia State Beach (sound)	Weekly	Enterococci	8			1-12	
Edgartown	Norton Point Beach (East Katama Bay)	Weekly	Enterococci	7			1-88	
Edgartown	Norton Point Beach (East ocean)	Weekly	Enterococci	7			1-28	
Edgartown	Norton Point Beach (West bay)	Weekly	Enterococci	8	1	126	1-46	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Edgartown	Norton Point Beach (West ocean)	Weekly	Enterococci	7			1-24	
Edgartown	South Beach State Park	Weekly	Enterococci	10			1-8	
Edgartown	Wasque Swim Beach	Weekly	Enterococci	7			1-14	
Essex	Clammer's Beach	Weekly	Enterococci	12			2-88	
Essex	Front	Weekly	Enterococci	14			2-88	
Fairhaven	Fort Phoenix	Weekly	Enterococci	12			2-32	
Fairhaven	Knollmere	Once	Enterococci	1			2-2	
Fairhaven	Manhattan Avenue	Weekly	Enterococci	11	2	110-250	1-22	
Fairhaven	Raymond Street	Weekly	Enterococci	10			1-85	
Fairhaven	Weeden Road	Weekly	Enterococci	7			1-12	
Fairhaven	West Island Town Beach	Weekly	Enterococci	10			1-20	
Falmouth	Acapesket Improvement Association	Weekly	Enterococci	12			2-8	
Falmouth	Bikepath Beach	Weekly	Enterococci	13			2-22	
Falmouth	Birch Lane	Weekly	Enterococci	4			4-32	
Falmouth	Bristol (1)	Weekly	Enterococci	12			2-20	
Falmouth	Bristol (2)	Weekly	Enterococci	12			2-12	
Falmouth	Chapoquoit	Weekly	Enterococci	13			2-68	
Falmouth	Chapoquoit Associates - Front Beach	Weekly	Enterococci	13			2-42	
Falmouth	Chapoquoit Associates - Little Beach	Weekly	Enterococci	13			2-14	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Falmouth	Falmouth Associates - 564 Surf Drive	Weekly	Enterococci	12			2-10	
Falmouth	Falmouth Heights (1)	Weekly	Enterococci	13			1-46	
Falmouth	Falmouth Heights (2)	Weekly	Enterococci	12			2-10	
Falmouth	Falmouth Yacht Club	Weekly	Enterococci	12			2-24	
Falmouth	Jetty Lane	Weekly	Enterococci	13			2-24	
Falmouth	Little Island Beach Preserve	Weekly	Enterococci	13			2-16	
Falmouth	Megansett (North)	Weekly	Enterococci	13			1-12	
Falmouth	Megansett (South)	Weekly	Enterococci	13			2-94	
Falmouth	Menauhant (1)	Weekly	Enterococci	13			2-2	
Falmouth	Menauhant (2)	Weekly	Enterococci	12			2-4	
Falmouth	Mill Road	Weekly	Enterococci	13			1-18	
Falmouth	New Silver (Silver Beach Improvement Association)	Weekly	Enterococci	13			2-28	
Falmouth	Nobska Beach Association	Weekly	Enterococci	11			2-16	
Falmouth	Old Silver 1 (North)	Weekly	Enterococci	13			2-34	
Falmouth	Old Silver 1 (South)	Weekly	Enterococci	13			2-30	
Falmouth	Old Silver 2 (North)	Weekly	Enterococci	26	2	112-112	2-58	
Falmouth	Old Silver 2 (South)	Weekly	Enterococci	11			2-52	
Falmouth	Old Silver Estates	Weekly	Enterococci	13			2-32	
Falmouth	Saconnesett Hills Association	Weekly	Enterococci	11			2-34	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Falmouth	Shorewood Assn (Beach 1)	Weekly	Enterococci	14			2-30	
Falmouth	Shorewood Assn (Beach 2)	Weekly	Enterococci	8			2-10	
Falmouth	Shorewood Assn (Beach 3)	Weekly	Enterococci	8			2-12	
Falmouth	Sippewissett Beach Trust	Weekly	Enterococci	13			2-18	
Falmouth	Stoney Beach (MBL)	Weekly	Enterococci	16	1	400	2-42	
Falmouth	Surf Drive (1)	Weekly	Enterococci	13			2-60	
Falmouth	Surf Drive (2)	Weekly	Enterococci	13			2-48	
Falmouth	Surf Drive (pool)	Weekly	Enterococci	13			1-12	
Falmouth	Trunk River	Once	Enterococci	1			78-78	
Falmouth	Wild Harbor	Weekly	Enterococci	9			2-20	
Falmouth	Wood Neck Beach	Weekly	Enterococci	13			2-28	
Falmouth	Wood Neck River	Weekly	Enterococci	15	2	114-140	2-48	
Gloucester	Cressy's	Weekly	Enterococci	10			2-74	
Gloucester	Good Harbor	Weekly	Enterococci	10			2-76	
Gloucester	Good Harbor Creek	Weekly	Enterococci	10	1	128	2-95	
Gloucester	Half Moon	Weekly	Enterococci	10			2-66	
Gloucester	Niles	Weekly	Enterococci	10			2-72	
Gloucester	Pavillion	Weekly	Enterococci	12			2-98	
Gloucester	Plum Cove	Weekly	Enterococci	10			2-38	
Gloucester	Wingearsheek	Weekly	Enterococci	10			4-100	
Harwich	Allen Harbor	Weekly	Enterococci	4			2-6	
Harwich	Atlantic Avenue	Weekly	Enterococci	12			2-8	
Harwich	Bank Street	Weekly	Enterococci	11			2-16	
Harwich	Bayview	Weekly	Enterococci	11			2-22	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Harwich	Brooks	Weekly	Enterococci	11			2-12	
Harwich	Earl Road	Weekly	Enterococci	11			2-60	
Harwich	Grey Neck	Weekly	Enterococci	11			2-14	
Harwich	Merkel Beach (Snow Inn Road)	Weekly	Enterococci	12			2-19	
Harwich	Neel Road	Weekly	Enterococci	12			2-6	
Harwich	Old Mill Point Assn (Left)	Weekly	Enterococci	13			2-8	
Harwich	Old Mill Point Assn (Right)	Weekly	Enterococci	13			2-6	
Harwich	Pleasant Bay	Weekly	Enterococci	22	1	132	2-84	1
Harwich	Pleasant Road	Weekly	Enterococci	6			2-4	
Harwich	Red River (deep hole)	Weekly	Enterococci	1			2-2	
Harwich	Red River (East)	Weekly	Enterococci	12			2-20	
Harwich	Red River (middle)	Weekly	Enterococci	10			2-26	
Harwich	Red River (West)	Weekly	Enterococci	13			2-12	
Harwich	Riverside Harbor (Wixon Dock)	Weekly	Enterococci	10			2-60	
Harwich	Round Cove	Weekly	Enterococci	13	1	190	1-66	
Harwich	Seabreeze	Weekly	Enterococci	10			1-31	
Harwich	The Belmont	Weekly	Enterococci	7			2-6	
Harwich	Wequasset Inn Resort	Weekly	Enterococci	13			1-18	
Harwich	Wyndmere Bluffs	Weekly	Enterococci	11			1-31	
Harwich	Zylpha	Weekly	Enterococci	11			2-16	
Hingham	Belair	Weekly	Enterococci	11			2-76	
Hingham	Bumkin Isle	Weekly	Enterococci	4			2-46	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Hingham	Cliff Road	Weekly	Enterococci	11			2-88	
Hingham	Kimball	Weekly	Enterococci	11			2-44	
Hingham	Melville	Weekly	Enterococci	11			2-62	
Hingham	North	Weekly	Enterococci	4			2-90	
Hingham	Seal Cove	Weekly	Enterococci	11	1	640	2-86	
Hingham	Town Beach	Weekly	Enterococci	4			2-86	
Hingham	Wampatuck	Weekly	Enterococci	11			2-96	
Hingham	Yacht Club	Weekly	Enterococci	4			2-14	
Hull	A Street Bay Side	Weekly	Enterococci	11			2-100	
Hull	A Street Ocean	Weekly	Enterococci	11			2-58	
Hull	Darcy's	Weekly	Enterococci	10			2-60	
Hull	Gunrock	Weekly	Enterococci	11			2-58	
Hull	Helen Street	Weekly	Enterococci	11			2-34	
Hull	Kenburma	Weekly	Enterococci	11			2-20	
Hull	Nantasket (bathhouse)	Weekly	Enterococci	11			1-36	
Hull	Nantasket (North site)	Weekly	Enterococci	11			1-26	
Hull	Nantasket (Park St)	Weekly	Enterococci	11			1-50	
Hull	Nantasket (Water St)	Weekly	Enterococci	11			1-16	
Hull	Newport	Weekly	Enterococci	11			2-100	
Hull	Spring Street	Weekly	Enterococci	10			2-90	
Hull	Whitehead	Weekly	Enterococci	11			6-66	
Hull	XYZ	Weekly	Enterococci	11			2-24	
Ipswich	Clark	Weekly	Enterococci	12			1-10	
Ipswich	Cranes	Weekly	Enterococci	12			1-10	
Ipswich	Cranes - Steep Hill	Weekly	Enterococci	12			1-35	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Ipswich	Little Neck	Weekly	Enterococci	12			1-40	
Ipswich	Pavillion	Weekly	Enterococci	12			1-14	
Ipswich	Pavillion (outfall)	Weekly	Enterococci	10			1-21	
Kingston	Gray's	Weekly	Enterococci	7	2	200-680	10-45	
Kingston	Rocky Nook	Weekly	Enterococci	6	1	200	5-40	
Lynn	Kings (Nirvana)	Daily	Enterococci	57	2	115-184	12-74	2
Lynn	Kings	Daily	Enterococci	15	1	142	1-38	1
Lynn	Kings (Stacy Brook)	Daily	Enterococci	11	5	138-610	8-88	
Manchester-by-the-Sea	Black	Weekly	Enterococci	12			1-97	
Manchester-by-the-Sea	Magnolia (1)	Weekly	Enterococci	11			2-100	
Manchester-by-the-Sea	Magnolia (2)	Weekly	Enterococci	1			10-10	
Manchester-by-the-Sea	Manchester Bath & Tennis	Weekly	Enterococci	8			1-55	
Manchester-by-the-Sea	Singing (parking lot)	Weekly	Enterococci	12			1-24	
Manchester-by-the-Sea	Singing	Weekly	Enterococci	12			2-23	
Manchester-by-the-Sea	Tuck's Point	Weekly	Enterococci	13	1	160	10-49	
Manchester-by-the-Sea	West Manchester	Weekly	Enterococci	12	1	190	2-72	
Manchester-by-the-Sea	White	Weekly	Enterococci	12			2-10	
Marblehead	Crocker Park	Weekly	Enterococci	10			4-66	
Marblehead	Devereux	Weekly	Enterococci	11			2-36	
Marblehead	Gas House	Weekly	Enterococci	12			2-98	
Marblehead	Grace Oliver	Weekly	Enterococci	15			2-92	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Marblehead	Stramski	Weekly	Enterococci	17	2	122-166	2-92	2
Marblehead	Sunset Road	Weekly	Enterococci	5			16-48	
Marblehead	Village Street	Weekly	Enterococci	11			2-80	
Marion	Beverly Yacht	Weekly	Enterococci	8			1-43	
Marion	Converse Point	Weekly	Enterococci	10	1	250	1-68	
Marion	Dexter Lane	Weekly	Enterococci	9			2-55	
Marion	Island Wharf	Weekly	Enterococci	8			1-43	
Marion	Oakdale Avenue	Weekly	Enterococci	10	2	138-385	1-100	
Marion	Piney Point	Weekly	Enterococci	8			1-26	
Marion	Planting Island	Weekly	Enterococci	9			1-11	
Marion	River Road	Weekly	Enterococci	10	1	250	4-79	
Marion	Silver Shell (North)	Weekly	Enterococci	9			1-48	
Marion	Silver Shell (South)	Weekly	Enterococci	8			1-76	
Marion	Tabor Academy (1)	Weekly	Enterococci	8			1-11	
Marion	Tabor Academy (2)	Weekly	Enterococci	8			1-10	
Marshfield	9th Road	Weekly	Enterococci	9			2-22	
Marshfield	Brant Rock	Weekly	Enterococci	9			2-26	
Marshfield	Fieldston	Weekly	Enterococci	9			2-68	
Marshfield	Green Harbor	Weekly	Enterococci	9			2-80	
Marshfield	Rexhame	Weekly	Enterococci	9			2-102	
Mashpee	Callies Beach	Weekly	Enterococci	11			2-10	
Mashpee	Mashpee Neck Road Landing	Weekly	Enterococci	13			2-16	
Mashpee	Maushup Village	Weekly	Enterococci	11			2-26	
Mashpee	New Seabury Inn	Weekly	Enterococci	9			2-34	
Mashpee	Poponesset	Weekly	Enterococci	3			2-2	
Mashpee	Poponesset Spit	Once	Enterococci	1			2-2	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Mashpee	Popponessett Beach Assoc	Weekly	Enterococci	25			1-40	
Mashpee	Seconsett Island Causeway	Weekly	Enterococci	13			1-26	
Mashpee	South Cape Beach	Weekly	Enterococci	13			2-22	
Mattapoissett	Antasawomak	Weekly	Enterococci	9			1-56	
Mattapoissett	Brant Beach	Weekly	Enterococci	9			1-6	
Mattapoissett	Crescent	Weekly	Enterococci	9			1-24	
Mattapoissett	Harbor 1	Weekly	Enterococci	9			1-12	
Mattapoissett	Harbor 2	Weekly	Enterococci	9			1-12	
Mattapoissett	Hollywoods (1)	Weekly	Enterococci	9			1-26	
Mattapoissett	Hollywoods (2)	Weekly	Enterococci	9			1-16	
Mattapoissett	Leisure Shores	Weekly	Enterococci	9			1-51	
Mattapoissett	Mattapoissett Shores Association	Weekly	Enterococci	10	1	172	1-44	
Mattapoissett	Peases Point	Weekly	Enterococci	9			1-39	
Mattapoissett	Point Connett	Weekly	Enterococci	9			1-12	
Mattapoissett	Town Beach	Weekly	Enterococci	5	1	170	2-36	
Nahant	Black Rock	Weekly	Enterococci	13			2-64	
Nahant	Canoe	Weekly	Enterococci	13			2-22	
Nahant	Nahant Beach (flagpole)	Weekly	Enterococci	12	1	310	6-92	
Nahant	Nahant Beach (North of bathhouse)	Weekly	Enterococci	8	1	128	15-90	1
Nahant	Nahant Beach (parking lot 9)	Weekly	Enterococci	12			6-92	
Nahant	Nahant Beach (South)	Weekly	Enterococci	12	1	490	1-70	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Nahant	Short	Weekly	Enterococci	12			2-30	
Nahant	Tudor	Weekly	Enterococci	13			6-102	
Nantucket	40th Pole 1	Weekly	Enterococci	6			1-8	
Nantucket	40th Pole 2	Weekly	Enterococci	6			2-4	
Nantucket	Children's	Weekly	Enterococci	8	1	146	2-38	
Nantucket	Cisco	Weekly	Enterococci	6			2-24	
Nantucket	Cliffside	Weekly	Enterococci	6			2-14	
Nantucket	Dionis	Weekly	Enterococci	6			2-14	
Nantucket	Jettes	Weekly	Enterococci	6			2-8	
Nantucket	Madaket	Weekly	Enterococci	6			2-2	
Nantucket	Miacomet	Weekly	Enterococci	6			2-4	
Nantucket	Sconset 1	Weekly	Enterococci	7			2-14	
Nantucket	Sconset 2	Weekly	Enterococci	5			2-10	
Nantucket	Sewerbeds	Weekly	Enterococci	6			2-7	
Nantucket	Surfside 1	Weekly	Enterococci	6			2-4	
Nantucket	Surfside 2	Weekly	Enterococci	6			2-2	
Nantucket	Warren's Landing	Weekly	Enterococci	5			1-8	
Nantucket	Washing Pond	Weekly	Enterococci	5			2-6	
Nantucket	Washington Street	Weekly	Enterococci	7	1	400	2-24	
New Bedford	400 North	Weekly	Enterococci	10			1-19	
New Bedford	400 South	Weekly	Enterococci	10			1-73	
New Bedford	Davy's Locker	Weekly	Enterococci	10			1-10	
New Bedford	J. Beach	Weekly	Enterococci	10			1-59	
New Bedford	Kids Beach	Weekly	Enterococci	10			1-5	
New Bedford	O'Tools	Weekly	Enterococci	10			1-3	
New Bedford	Squid	Weekly	Enterococci	10			1-78	
New Bedford	Tabor South	Weekly	Enterococci	10			1-9	
New Bedford	Tower 1	Weekly	Enterococci	10			1-8	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
New Bedford	Tower 4	Weekly	Enterococci	10			1-18	
Newbury	Plum Island	Weekly	Enterococci	17			1-55	
Newburyport	Plum Island (55th St)	Weekly	Enterococci	5			2-34	
Newburyport	Plum Island (island 1)	Weekly	Enterococci	6			2-35	
Newburyport	Plum Island (island 2)	Weekly	Enterococci	6			2-75	
Newburyport	Plum Island (basin mouth)	Weekly	Enterococci	6			2-55	
Oak Bluffs	Eastville Town Beach - Drawbridge	Weekly	Enterococci	6			1-10	
Oak Bluffs	Eastville Town Beach - Harbor	Weekly	Enterococci	6			1-18	
Oak Bluffs	Joseph Sylvia State Beach (little bridge)	Weekly	Enterococci	8			1-28	
Oak Bluffs	Joseph Sylvia State Beach (Sound)	Weekly	Enterococci	8			1-20	
Oak Bluffs	Lagoon Pond Herring Run	Weekly	Enterococci	6			1-12	
Oak Bluffs	Marinelli (Jetty) Beach	Weekly	Enterococci	8			1-4	
Oak Bluffs	Pay Beach	Weekly	Enterococci	8			1-6	
Oak Bluffs	Sailing Camp Park	Weekly	Enterococci	5			1-6	
Orleans	Kent's	Weekly	Enterococci	14	1	400	2-34	1
Orleans	Little Inn at Pleasant Bay	Weekly	Enterococci	13			2-62	
Orleans	Meeting House Pond	Weekly	Enterococci	14			2-80	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Orleans	Nauset	Weekly	Enterococci	12			2-17	
Orleans	Paw Wah Pond	Weekly	Enterococci	14			2-8	
Orleans	Percilla's Landing	Weekly	Enterococci	14			2-12	
Orleans	Pleasant Bay	Weekly	Enterococci	20	2	144-194	1-50	2
Orleans	Quanset Harbor Club Association	Weekly	Enterococci	13			2-86	
Orleans	Rock Harbor	Weekly	Enterococci	16	2	116-206	2-96	
Orleans	Skaket	Weekly	Enterococci	18	1	260	2-16	1
Orleans	Skaket Beach Condos	Weekly	Enterococci	13			2-26	
Orleans	Town Cove	Weekly	Enterococci	14	1	400	2-54	1
Plymouth	Nelson Street	Weekly	Enterococci	13	3	108-1200	5-94	
Plymouth	Plymouth (1)	Weekly	Enterococci	12			2-36	
Plymouth	Plymouth (2)	Weekly	Enterococci	11			2-62	
Plymouth	Plymouth (3)	Weekly	Enterococci	12			2-48	
Plymouth	Plymouth (4)	Weekly	Enterococci	11			2-44	
Plymouth	Plymouth (5)	Weekly	Enterococci	12			2-16	
Plymouth	Stephen's Field	Once	Enterococci	8			5-100	1
Plymouth	White Horse (Full Sail)	Weekly	Enterococci	10			2-50	
Plymouth	White Horse (Hill Top)	Weekly	Enterococci	10			2-30	
Provincetown	29 Commercial Street	Weekly	Enterococci	9	1	130	6-6	1
Provincetown	333 Commercial Street	Weekly	Enterococci	19	2	194-218	2-2	3
Provincetown	451 Commerical Street	Weekly	Enterococci	14	1	111	2-12	1

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Provincetown	593 Commercial Street	Weekly	Enterococci	32	4	134-256	2-86	4
Provincetown	Atkins Lane	Weekly	Enterococci	14	1	110	2-68	1
Provincetown	Atlantic Avenue	Weekly	Enterococci	12			2-66	
Provincetown	Court Street	Weekly	Enterococci	13	1	400	2-97	1
Provincetown	Herring Cove	Weekly	Enterococci	8			2-68	
Provincetown	Herring Cove	Weekly	Enterococci	8			2-32	
Provincetown	Johnson Street	Weekly	Enterococci	14			2-10	
Provincetown	Kendal Lane	Weekly	Enterococci	14			2-10	
Provincetown	Provincetown Inn	Weekly	Enterococci	12			2-98	
Provincetown	Race Point	Weekly	Enterococci	8			2-100	
Provincetown	Race Point	Weekly	Enterococci	8			2-90	
Provincetown	Race Point	Weekly	Enterococci	8			1-2	
Provincetown	Ryder Street (left)	Weekly	Enterococci	45	9	118-400	2-6	2
Provincetown	Ryder Street (middle)	Weekly	Enterococci	1			2-2	1
Provincetown	Town Landing - Breakwater	Weekly	Enterococci	15	2	132-300	2-78	2
Provincetown	Town Landing - Snail Road	Weekly	Enterococci	12	1	280	4-4	1
Provincetown	Town Landing West of Coast Guard	Weekly	Enterococci	13	1	200	2-50	
Provincetown	West End Lot	Weekly	Enterococci	12			2-72	
Quincy	Avalon	Weekly	Enterococci	12			2-64	
Quincy	Broady (Baker)	Weekly	Enterococci	16	6	118-360	2-29	2
Quincy	Chikatawbot	Weekly	Enterococci	14	1	170	2-70	1
Quincy	Edgewater	Weekly	Enterococci	12			2-82	
Quincy	Heron	Weekly	Enterococci	14	3	110-640	4-98	1

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Quincy	Merrymount	Weekly	Enterococci	15	2	130-170	2-72	2
Quincy	Mound	Weekly	Enterococci	14	1	340	2-98	2
Quincy	Nickerson	Weekly	Enterococci	15	3	160-9600	2-95	2
Quincy	Orchard Street	Weekly	Enterococci	13	2	122-7300	2-100	
Quincy	Parkhurst	Weekly	Enterococci	12			2-98	
Quincy	Rhoda	Weekly	Enterococci	15	1	470	2-44	2
Quincy	Wollaston (Channing St)	Daily	Enterococci	57	7	115-4600	2-72	1
Quincy	Wollaston (Milton St)	Daily	Enterococci	57	5	130-1390	4-100	
Quincy	Wollaston (Rice Rd)	Daily	Enterococci	57	4	125-1120	1-92	1
Quincy	Wollaston (Sachem St)	Daily	Enterococci	57	8	120-5500	2-100	3
Revere	Revere (@ state police)	Weekly	Enterococci	12	2	172-460	1-94	1
Revere	Revere (Oak Island St)	Weekly	Enterococci	12	2	116-130	1-95	
Revere	Revere (Point of Pines)	Weekly	Enterococci	11			1-36	
Revere	Revere (Shirley St)	Weekly	Enterococci	12	1	120	1-94	
Revere	Short	Weekly	Enterococci	13	2	960-1100	1-72	2
Rockport	Back	Weekly	Enterococci	15			1-48	
Rockport	Cape Hedge	Weekly	Enterococci	11			2-66	
Rockport	Front	Weekly	Enterococci	11			0-51	
Rockport	Long	Weekly	Enterococci	10			0-14	
Rockport	Long	Weekly	Enterococci	9			0-33	
Rockport	Old Garden	Weekly	Enterococci	11			0-10	
Rockport	Pebble	Weekly	Enterococci	11			0-10	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Salem	Collins Cove	Weekly	Enterococci	14	2	208-440	1-24	
Salem	Dead Horse	Weekly	Enterococci	15	2	118-2200	0-11	
Salem	Forest River Point	Weekly	Enterococci	10			2-58	
Salem	Juniper Point	Weekly	Enterococci	14	2	340-2800	2-72	
Salem	Mackey	Weekly	Enterococci	13	1	230	4-100	
Salem	Naumkeag	Weekly	Enterococci	13	1	152	2-80	
Salem	Ocean Avenue	Weekly	Enterococci	14	2	310-570	4-95	
Salem	Osgood	Weekly	Enterococci	13	1	200	2-60	
Salem	Pickman	Weekly	Enterococci	14	2	190-190	2-92	
Salem	Pioneer	Weekly	Enterococci	11			2-82	
Salem	Steps	Weekly	Enterococci	14	2	790-3000	10-90	
Salem	Willow Avenue	Weekly	Enterococci	14	2	118-128	2-70	
Salem	Willows Pier	Weekly	Enterococci	13	1	7000	4-78	
Salem	Winter Island (Waikiki)	Weekly	Enterococci	12			2-98	
Salisbury	Salisbury	Weekly	Enterococci	18	1	120	2-92	1
Sandwich	East Sandwich	Weekly	Enterococci	13			2-80	
Sandwich	Scusset	Weekly	Enterococci	15			2-30	
Sandwich	Torrey Beach Community Association	Weekly	Enterococci	16	1	120	2-69	1
Sandwich	Town Neck (Boardwalk)	Weekly	Enterococci	13			2-18	
Sandwich	Town Neck (Horizons)	Weekly	Enterococci	12			2-18	
Scituate	Egypt	Weekly	Enterococci	11			2-100	
Scituate	Humarock	Weekly	Enterococci	12	1	410	2-10	
Scituate	Minot	Weekly	Enterococci	11			2-46	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Scituate	Peggotty	Weekly	Enterococci	13	1	284	2-80	1
Scituate	Sand Hills	Weekly	Enterococci	11			2-92	
Somerset	Pearse	Weekly	Enterococci	13	4	156-250	2-55	
Swampscott	Eisman's	Weekly	Enterococci	12			8-77	
Swampscott	Fisherman's	Weekly	Enterococci	12			2-73	
Swampscott	Kings North	Weekly	Enterococci	12			2-72	
Swampscott	Phillips	Weekly	Enterococci	12			2-43	
Swampscott	Preston	Weekly	Enterococci	12			2-45	
Swampscott	Stacey	Weekly	Enterococci	12			2-38	
Swampscott	Whales	Weekly	Enterococci	12			2-34	
Swansea	Cedar Cove	Weekly	Enterococci	7			2-74	
Swansea	Coles River Club off Harbor Rd	Once	Enterococci	1			2-46	
Swansea	Sandy Beach	Weekly	Enterococci	7	2	132-148	1-30	
Swansea	The Bluffs	Weekly	Enterococci	23	1	250	28-28	
Swansea	Town Beach	Once	Enterococci	1			1-38	
Tisbury	Hilman's Point	Weekly	Enterococci	7			1-53	
Tisbury	Lake Street	Weekly	Enterococci	9	1	228	1-1	
Tisbury	Owen Little Way	Weekly	Enterococci	7			1-16	
Tisbury	Owen Park	Weekly	Enterococci	9	1	168	1-18	
Tisbury	Sound @ Wilfred's Pond Reserve	Weekly	Enterococci	4			1-72	
Tisbury	Tashmoo Beach	Weekly	Enterococci	7	1	220	1-30	
Tisbury	Tashmoo Cut	Weekly	Enterococci	7			1-24	
Tisbury	Vineyard Harbor Motel	Weekly	Enterococci	5			1-30	
Truro	379 Shore Road	Weekly	Enterococci	13			1-14	
Truro	496 Shore Road	Weekly	Enterococci	14			2-64	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Truro	648 Shore Road	Weekly	Enterococci	14			2-40	
Truro	Ballston	Weekly	Enterococci	15			2-54	
Truro	Coast Guard Town	Weekly	Enterococci	15			1-28	
Truro	Cold Storage/Pond Village	Weekly	Enterococci	16	1	128	2-36	1
Truro	Corn Hill	Weekly	Enterococci	16	1	212	2-38	1
Truro	Fisher	Weekly	Enterococci	14			2-32	
Truro	Great Hollow	Weekly	Enterococci	14			2-22	
Truro	Head of the Meadow (National)	Weekly	Enterococci	9			2-8	
Truro	Head of the Meadow (Town)	Weekly	Enterococci	13			2-8	
Truro	High Head Road	Weekly	Enterococci	6			2-4	
Truro	Long Nook	Weekly	Enterococci	13			2-4	
Truro	Noon's Landing	Weekly	Enterococci	14			2-98	
Truro	Pamet Harbor	Weekly	Enterococci	14			2-4	
Truro	Ryder	Weekly	Enterococci	14			2-52	
Truro	Town Landing Beach Point	Weekly	Enterococci	13			2-26	
Wareham	Bay Street	Once	Enterococci	1			2-28	
Wareham	Little Harbor	Weekly	Enterococci	7			2-52	
Wareham	North Boulevard	Weekly	Enterococci	8			2-2	
Wareham	Onset	Weekly	Enterococci	9			1-10	
Wareham	Point Independence	Weekly	Enterococci	7			2-4	
Wareham	Riverside Avenue	Weekly	Enterococci	8			2-28	
Wareham	Shell Point	Weekly	Enterococci	8			2-4	
Wareham	Swift's	Weekly	Enterococci	8			2-22	
Wareham	Swift's Neck	Weekly	Enterococci	7			2-2	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Wellfleet	Burton Baker	Weekly	Enterococci	12			1-4	
Wellfleet	Cahoon Hollow	Weekly	Enterococci	12			2-40	
Wellfleet	Chequesset Yacht and Country Club	Weekly	Enterococci	13			2-8	
Wellfleet	Duck Harbor	Weekly	Enterococci	12			2-6	
Wellfleet	Indian Neck	Weekly	Enterococci	12			2-28	
Wellfleet	Kellers Corner	Weekly	Enterococci	12			2-2	
Wellfleet	Maguires Landing	Weekly	Enterococci	12			2-12	
Wellfleet	Marconi	Weekly	Enterococci	8			2-16	
Wellfleet	Marconi	Weekly	Enterococci	8			2-4	
Wellfleet	Marconi	Weekly	Enterococci	8			1-4	
Wellfleet	Mayo	Weekly	Enterococci	13			2-4	1
Wellfleet	Newcomb Hollow	Weekly	Enterococci	12			2-6	
Wellfleet	Omaha Road	Weekly	Enterococci	12			2-26	
Wellfleet	Powers	Weekly	Enterococci	12			2-28	
Wellfleet	White Crest	Weekly	Enterococci	11			1-12	
West Tisbury	Great Pond @ Long Point	Weekly	Enterococci	5			2-16	
West Tisbury	Lambert's Cove Beach	Weekly	Enterococci	11			2-22	
West Tisbury	Lambert's Cove Beach	Weekly	Enterococci	9			1-8	
West Tisbury	Ocean @ Long Point	Weekly	Enterococci	9			1-40	
West Tisbury	Sepiessa Point	Weekly	Enterococci	9	1	284	1-28	
Westport	Adamsville Road (Old Harbor)	Twice	Enterococci	2	1	120	1-8	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Westport	Adamsville Rd - River Landing	Twice	Enterococci	2	2	154-250	1-40	
Westport	Baker's Beach	Weekly	Enterococci	10			91-91	
Westport	C & K Club	Weekly	Enterococci	9			1-6	
Westport	Cherry & Webb	Weekly	Enterococci	9			1-62	
Westport	East Beach	Weekly	Enterococci	10			1-18	
Westport	Elephant	Weekly	Enterococci	9			1-33	
Westport	Horseneck	Weekly	Enterococci	13			1-2	
Westport	Howland	Weekly	Enterococci	8			2-2	
Westport	Spindle Rock	Weekly	Enterococci	9			1-53	
Westport	Town Beach	Weekly	Enterococci	20			1-2	
Westport	Yacht Club	Weekly	Enterococci	23			1-72	
Weymouth	Lane (New Wessagussett)	Weekly	Enterococci	14	1	110	1-76	
Weymouth	Wessagussett (Old Wessagussett)	Weekly	Enterococci	14	1	370	5-80	
Winthrop	Donovans	Weekly	Enterococci	7			2-78	
Winthrop	Grandview	Weekly	Enterococci	7	1	110	5-40	
Winthrop	Halford	Weekly	Enterococci	7	1	200	5-55	
Winthrop	Pico	Weekly	Enterococci	7	1	535	5-40	
Winthrop	Winthrop	Weekly	Enterococci	19	1	134	5-30	1
Winthrop	Yerrill	Weekly	Enterococci	7	2	130-370	1-54	
Yarmouth	Bass River	Weekly	Enterococci	13			5-75	
Yarmouth	Bass River	Weekly	Enterococci	12			2-84	
Yarmouth	Baxter Avenue	Weekly	Enterococci	12			2-38	
Yarmouth	Bay Road	Weekly	Enterococci	14			2-24	
Yarmouth	Beachwood	Once	Enterococci	1			2-80	
Yarmouth	Colonial Acres	Weekly	Enterococci	36	9	108-400	2-2	

Table 16: Water quality data for marine public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	# Tests	# Exceedances	Range of Exceedances	Range of Non-Exceedances	Number of Postings ¹
Yarmouth	Columbus Avenue	Weekly	Enterococci	13			2-92	
Yarmouth	Englewood	Weekly	Enterococci	14			2-88	
Yarmouth	Follins Pond	Weekly	E. coli	1			2-46	
Yarmouth	Follins Pond	Weekly	Enterococci	14	1	364	2-62	
Yarmouth	Gray's Beach	Weekly	Enterococci	14			2-96	
Yarmouth	Great Island Ocean Club	Weekly	Enterococci	7			2-6	
Yarmouth	Parkers River East	Weekly	Enterococci	13	1	182	2-88	
Yarmouth	Parkers River West	Weekly	Enterococci	10			2-50	
Yarmouth	Seagull (Center)	Weekly	Enterococci	11			2-78	
Yarmouth	Seagull (Left)	Weekly	Enterococci	15	1	108	2-28	
Yarmouth	Seagull (Right)	Weekly	Enterococci	15	1	401	2-30	
Yarmouth	Seaview	Weekly	Enterococci	12			2-30	
Yarmouth	South Middle	Weekly	Enterococci	13			2-22	
Yarmouth	Thatcher Town Park	Weekly	Enterococci	12			2-16	
Yarmouth	Wilbur Park	Weekly	Enterococci	12			2-63	
Yarmouth	Windmill	Weekly	Enterococci	13			2-10	

1. Postings for a beach were assumed to be for all parts of the beach with that name and were listed in that way

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Abington	Island Grove Beach	Weekly	E. coli	1			
Abington	Island Grove Beach	Weekly	Enterococci	10			
Acton	Nara Beach	Weekly	E. coli	22	4	340-440	1
Agawam	Robinson Pond Beach 1	Weekly	Enterococci	19	4	154-600	
Agawam	Robinson Pond Beach 2	Weekly	Enterococci	7			
Amesbury	Camp Bauercrest	Weekly	E. coli	10			
Amesbury	Glen Devin Condominiums	Weekly	E. coli	11			
Amesbury	Lake Attitash-Dam/Bathing area	Weekly	E. coli	12			
Amesbury	Lake Gardner-Greatest batherload	Weekly	E. coli	15	2	260-4000	
Amesbury	Whitehall Lake Conominiums-Crowninshield Mgmt.	Weekly	E. coli	14			
Arlington	Arlington Reservoir	Weekly	Fecal Coliform	7			
Ashburnham	Camp Howe Beach	Weekly	E. coli	14			
Ashburnham	Camp Winnekeag Pond	Weekly	E. coli	10			
Ashby	Camp Middlesex	Weekly	E. coli	9			
Ashby	Damon Pond Beach	Weekly	Enterococci	19	4	80-236	1
Ashfield	Ashfield Lake Beach	Weekly	E. coli	16			
Ashland	Ashland Reservoir-Main Beach	Weekly	Enterococci	22	3	62-600	1
Athol	Ellis Beach	Weekly	E. coli	17			
Athol	Silver Lake	Weekly	E. coli	15			
Ayer	Ayer Town Beach	Weekly	E. coli	12	1	600	1
Ayer	Mirror Lake	Weekly	E. coli	15	1	390	
Barnstable	Bearses Pond	Weekly	E. coli	12			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Barnstable	Garrett's Pond	Weekly	E. coli	12			
Barnstable	Gooseberry Pond	Weekly	E. coli	12			
Barnstable	Hamblin Pond	Weekly	E. coli	12			
Barnstable	Hathaway Pond	Weekly	E. coli	12			
Barnstable	Joshua's Pond	Weekly	E. coli	12			
Barnstable	Long Pond	Weekly	E. coli	11			
Barnstable	Lovell's Pond	Weekly	E. coli	12			
Barnstable	Middle Pond	Weekly	E. coli	12			
Barnstable	Middle Pond	Weekly	Enterococci	1			
Barnstable	Mystic Lake Race Lane	Weekly	E. coli	12			
Barnstable	Shallow Pond	Weekly	E. coli	12			
Barnstable	Shubael Pond	Weekly	E. coli	12			
Barnstable	Wequaquet Lake Town	Weekly	E. coli	11			
Barnstable	Wequaquet Lake Yacht	Weekly	E. coli	11			
Becket	Becket Woods Beach	Weekly	E. coli	16			
Becket	Becket Woods Dock	Weekly	E. coli	16			
Becket	Camp Becket Iroquois Beach	Weekly	E. coli	15			
Becket	Camp Becket Main Beach	Weekly	E. coli	15			
Becket	Camp Greylock Jr. Beach	Weekly	E. coli	11			
Becket	Camp Greylock Sr. Beach	Weekly	E. coli	11			
Becket	Camp Watitoh Beach	Weekly	E. coli	10			
Becket	Center Pond Assn. Beach	Weekly	E. coli	13			
Becket	Center Pond Beach	Weekly	E. coli	17			
Becket	Chimney Corners Beach	Weekly	E. coli	15			
Becket	Crystal Pond Beach	Weekly	E. coli	16			
Becket	Excalibur	Weekly	E. coli	17			
Becket	Indian Lake (boat dock)	Weekly	E. coli	16			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Becket	Indian Lake Large Beach	Weekly	E. coli	16			
Becket	Indian Lake Small Beach	Weekly	E. coli	16			
Becket	Indian Lake Small Pond Beach	Weekly	E. coli	16			
Becket	Lancelot Beach	Weekly	E. coli	17			
Becket	Little Robin Beach	Weekly	E. coli	14			
Becket	Mt. Grove Beach	Weekly	E. coli	16			
Becket	Robin Hood #1	Weekly	E. coli	17			
Becket	Robin Hood #2	Weekly	E. coli	16			
Becket	Shawnee Shore Beach	Weekly	E. coli	16			
Bedford	Springs Brook Park Bathing Beach (Pad)	Weekly	Enterococci	11			
Bedford	Springs Brook Park Bathing Beach (Rivulet)	Weekly	Enterococci	11			
Belchertown	Lake Arcadia	Weekly	E. coli	5			
Bellingham	Arcand Park	Weekly	E. coli	6	1	290	
Bellingham	Silver Lake	Weekly	E. coli	7	2	320-1300	
Billerica	Nutting Lake - Micozzi Beach (North)	Weekly	E. coli	8			
Billerica	Nutting Lake - Micozzi Beach (South)	Weekly	E. coli	8	1	340	
Bolton	Bolton Town Beach	Weekly	E. coli	13			
Bolton	Camp Virginia Beach	Weekly	E. coli	12	1	380	1
Bolton	Tom Denny Camp	Weekly	E. coli	8			
Bourne	Picture Lake	Weekly	E. coli	11			
Bourne	Queen Sewell Pond	Weekly	E. coli	11			
Boxford	Camp Rotary - Greatest Batherload	Weekly	E. coli	8			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Boxford	Camp Stepping Stone - Greatest Batherload	Weekly	E. coli	3			
Boxford	Camp Wakanda - Greatest Batherload	Weekly	E. coli	5			
Boxford	Danvers YMCA Daycamp	Weekly	E. coli	4			
Boxford	Stiles Pond - Greatest Batherload	Weekly	E. coli	15			
Braintree	Royal Lakes	Once	E. coli	1			
Braintree	Royal Lakes	Once	E. coli	1			
Braintree	Sunset Lake (dock)	Weekly	E. coli	27	3	300-1600	1
Braintree	Sunset Lake (left of dock)	Weekly	E. coli	10	3	344-1800	
Braintree	Sunset Lake (rt of dock)	Weekly	E. coli	7	2	240-300	
Braintree	Sunset Lake (outfall)	Weekly	E. coli	1			
Brewster	Blueberry Pond	Weekly	E. coli	13			
Brewster	Cape Cod Sea Camps Long Pond	Weekly	E. coli	12			
Brewster	Cliff Pond	Weekly	Enterococci	7	1	70	
Brewster	Flax Pond	Weekly	Enterococci	8			
Brewster	Greenland Pond	Weekly	E. coli	13			
Brewster	Little Cliff Pond	Weekly	Enterococci	7			
Brewster	Long Pond	Weekly	E. coli	14			
Brewster	Long Pond at Camp Favorite	Weekly	E. coli	11			
Brewster	Owl Pond	Weekly	E. coli	13			
Brewster	Sheep Pond	Weekly	E. coli	13			
Brewster	Slough Pond	Weekly	E. coli	13			
Brimfield	Dean Pond Beach	Weekly	Enterococci	18	2	78-80	
Brimfield	East Brimfield Reservoir	Weekly	Enterococci	16			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Brookfield	South Pond	Weekly	E. coli	11	1	310	
Charlemont	Cold River Pool	Weekly	Enterococci	14	2	100-120	1
Chatham	Goose Pond	Weekly	E. coli	1			
Chatham	Goose Pond	Weekly	Enterococci	19	2	102-200	1
Chatham	Pilgrim Village	Weekly	Enterococci	14			
Chatham	Schoolhouse Pond	Weekly	Enterococci	16			
Chatham	White Pond	Weekly	Enterococci	15			
Chelmsford	Baptist Pond (Dock)	Weekly	E. coli	11	1	600	1
Chelmsford	Baptist Pond (Ramp)	Weekly	E. coli	11	3	410-600	
Chelmsford	Freeman Lake (Dam)	Weekly	E. coli	10	1	240	
Chelmsford	Freeman Lake (Dock)	Weekly	E. coli	11	2	320-520	1
Chesterfield	Chesterfield Scout Reservation - BSA	Weekly	E. coli	11			
Chicopee	Chicopee Beach	Weekly	Enterococci	19			
Clarksburg	Mausert Pond - Day use area beach	Weekly	Enterococci	22	5	190-400	5
Concord	Annursnac Hill Assoc.	Weekly	E. coli	15			
Concord	Kennedy Pond	Weekly	E. coli	17	2	238-286	1
Concord	Silver Hill Assoc	Weekly	E. coli	18	3	338-1106	2
Concord	Walden Pond - Main	Weekly	E. coli	15			
Concord	Walden Pond - Main	Weekly	Enterococci	1			
Concord	Walden Pond - Red Cross	Weekly	E. coli	15			
Concord	Walden Pond - Red Cross	Weekly	Enterococci	1			
Concord	White Pond - SW Cove	Weekly	E. coli	6			
Concord	White Pond Assoc	Weekly	E. coli	15			
Cummington	Shire Village Beach	Weekly	E. coli	10			
Dartmouth	27 Lakewood	Weekly	Enterococci	10	4	101-1250	
Dartmouth	38 Lakeside	Weekly	Enterococci	7	2	160-256	

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Dartmouth	Lake Noquochokee	Once	Enterococci	1	1	1250	
Dennis	Flax Pond	Weekly	E. coli	10			
Dennis	Princess Beach-Scargo Lake	Weekly	E. coli	10			
Dennis	Scargo Lake	Weekly	E. coli	10			
Douglas	Breezy Picnic Grounds	Weekly	E. coli	9			
Douglas	Lake Manchaug Camping	Weekly	E. coli	11			
Douglas	Wallum Lake Terrace	Weekly	E. coli	11			
Douglas	Wallum Lake Terrace	Weekly	Enterococci	17	1	140	
Dracut	Fleur de Lis	Weekly	E. coli	8	2	440-1070	
Dracut	Grove	Weekly	E. coli	7			
Dracut	Hilltop	Weekly	E. coli	7			
Dracut	Lake Mascuppic	Weekly	E. coli	12	1	540	
Dracut	Mascuppic	Weekly	E. coli	7	1	1600	
Dracut	Passaconaway	Weekly	E. coli	7			
Dracut	Peter's Pond	Weekly	E. coli	8	2	600-1800	
Dracut	Richardson	Weekly	E. coli	7			
Duxbury	Island Creek	Twice	Enterococci	12	1	430	
East Brookfield	Camp Frank A Day	Weekly	E. coli	10			
East Brookfield	Lake Lashaway	Weekly	E. coli	11			
Eastham	Great Pond	Weekly	E. coli	13	1	280	
Eastham	Herring Pond	Weekly	E. coli	12			
Eastham	Long Pond	Weekly	E. coli	12			
Eastham	Minister's Pond	Weekly	E. coli	12			
Eastham	Wiley Park	Weekly	E. coli	12			
Easton	Swim area	Weekly	E. coli	7			
Egremont	Prospect Lake Park	Weekly	E. coli	16			
Essex	Centennial Grove	Weekly	E. coli	13			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Falmouth	Ashumet Pond	Weekly	E. coli	10			
Falmouth	Ashumet Pond Holly Sands	Weekly	E. coli	13	1	738	
Falmouth	Coonamessett Pond	Weekly	E. coli	13			
Falmouth	Crooked Pond	Weekly	E. coli	11			
Falmouth	Flax Pond	Weekly	E. coli	13			
Falmouth	Grew's Pond	Weekly	E. coli	11			
Falmouth	Jenkins Pond - Pinecrest	Weekly	E. coli	13			
Falmouth	Lochstead Association	Weekly	E. coli	10			
Falmouth	Mares Pond Association	Weekly	E. coli	13			
Falmouth	Sand Point Shores-Rock Hollow	Weekly	E. coli	13			
Falmouth	Sand Point Shores-White Cap	Weekly	E. coli	13			
Falmouth	Shady Lane HA-Crooked Pond	Once	E. coli	1			
Florida	Manice Education Center Beach	Weekly	E. coli	13			
Franklin	Chilson Beach	Weekly	E. coli	10	1	480	1
Gardner	Dunn Pond	Weekly	Enterococci	17			
Georgetown	American Legion Park	Weekly	E. coli	10	3	240-300	
Georgetown	Camp Leslie	Weekly	E. coli	9			
Goshen	Camp Howe	Weekly	E. coli	11			
Goshen	Hammond Acres	Weekly	E. coli	16			
Goshen	Upper Highland Lake - Campers Beach	Weekly	E. coli	3	1	380	
Goshen	Upper Highland Lake - Campers Beach	Weekly	Enterococci	17	1	200	1

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Goshen	Upper Highland Lake - Day use area beach	Weekly	Enterococci	17			1
Grafton	Silver Lake Beach	Weekly	E. coli	12	1	340	
Great Barrington	Green River	Weekly	E. coli	14	7	236-300	
Great Barrington	Lake Mansfield	Weekly	E. coli	19			
Greenfield	Greenfield Municipal Bathing Beach	Weekly	E. coli	19	3	450-1710	2
Groton	Baby Beach Lost Lake	Weekly	E. coli	7			
Groton	Groton Town Beach	Weekly	E. coli	19	3	157-600	3
Groton	Grotonwood Camp	Weekly	E. coli	11			
Halifax	19 Lake Street	Weekly	E. coli	13	1	400	
Halifax	Anawon Street	Weekly	E. coli	11			
Halifax	Cooke's Beach	Weekly	E. coli	13			
Halifax	Halifax Beach	Weekly	E. coli	12			
Halifax	Holmes Street	Weekly	E. coli	12			
Halifax	Lingan Street	Weekly	E. coli	13			
Halifax	Wamsutta	Weekly	E. coli	13			
Hanson	Arlene	Weekly	E. coli	7			
Hanson	Camp Kiwanee	Weekly	E. coli	7			
Hanson	Cranberry	Weekly	E. coli	7			
Hanson	Ocean Ave.	Weekly	E. coli	7			
Hanson	Wilkey's	Weekly	E. coli	7			
Harvard	Harvard Town Beach	Weekly	E. coli	12			
Harwich	Aunt Edie's Pond (Lakeview)	Three times	E. coli	3			
Harwich	Aunt Edie's Pond (Sandy Shore Way)	Three times	E. coli	3			
Harwich	Buck's Pond	Weekly	E. coli	14			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Harwich	Hinckley's Pond	Weekly	E. coli	10			
Harwich	Joseph's Pond Lakeside	Three times	E. coli	3			
Harwich	Joseph's Pond Vacation	Three times	E. coli	3			
Harwich	Long Pond Rte 124	Weekly	E. coli	10			
Harwich	Long Pond-Calhoun	Weekly	E. coli	10			
Harwich	Long Pond-Long Pond Drive	Weekly	E. coli	10			
Harwich	Robbins Pond	Weekly	E. coli	10			
Harwich	Sand Pond	Weekly	E. coli	10			
Harwich	Seymore Pond	Weekly	E. coli	10			
Harwich	Skinequit Pond	Weekly	E. coli	11			
Haverhill	Plug's Pond	Weekly	E. coli	7			
Hinsdale	Camp Asmere Beach	Weekly	E. coli	12			
Hinsdale	Camp Emerson Beach	Weekly	E. coli	9			
Hinsdale	Camp Emerson Marina	Weekly	E. coli	9			
Hinsdale	Camp Romaca (beach)	Three times	E. coli	3			
Hinsdale	Camp Romaca (lagoon)	Three times	E. coli	3			
Hinsdale	Camp Taconic Beach	Weekly	E. coli	10			
Hinsdale	Dan Duquette Sports Academy	Weekly	E. coli	15			
Hinsdale	Plunkett Lake Beach	Weekly	E. coli	16			
Holden	Camp Kinneywood Beach	Weekly	E. coli	9	1	478	
Holden	Eagle Lake	Weekly	E. coli	8	1	250	
Holliston	Pleasure Point	Weekly	E. coli	13			
Holliston	Stoddard	Weekly	E. coli	13			
Hopkinton	Hopkinton Reservoir-Upper Beach	Weekly	Enterococci	19	2	126-130	
Hopkinton	Sandy Beach (left)	Weekly	E. coli	12			
Hopkinton	Sandy Beach (middle)	Weekly	E. coli	12			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Hopkinton	Sandy Beach (outlet)	Weekly	E. coli	2	1	1090	
Hopkinton	Sandy Beach (right)	Weekly	E. coli	13			
Hubbardston	Comet Pond Beach (Left)	Weekly	E. coli	10			
Hubbardston	Comet Pond Beach (middle)	Weekly	E. coli	10			
Hubbardston	Comet Pond Beach (right)	Weekly	E. coli	10			
Hudson	Hudson Centennial Beach	Weekly	E. coli	13	1	320	1
Huntington	Westfield River Beach	Weekly	E. coli	1			
Huntington	Westfield River Beach	Weekly	Enterococci	40	13	76-420	3
Ipswich	Hood Pond-boat ramp	Weekly	Enterococci	13	1	290	1
Lakeville	Big Beach	Weekly	E. coli	1			
Lakeville	Big Beach	Weekly	Enterococci	8			
Lakeville	Bliss Road	Three times	Enterococci	3			1
Lakeville	Clark Shores 1	Weekly	E. coli	2	1	1300	
Lakeville	Clark Shores 1	Weekly	Enterococci	2	2	84-256	1
Lakeville	Clark Shores 2	Weekly	E. coli	2	1	450	
Lakeville	Clark Shores 2	Weekly	Enterococci	3	1	640	
Lakeville	Clark Shores 3	Weekly	E. coli	2	1	280	
Lakeville	Clark Shores 3	Weekly	Enterococci	7	3	64-286	3
Lakeville	Clear Pond	Weekly	Enterococci	9			
Lakeville	Little Beach	Weekly	E. coli	1			
Lakeville	Little Beach	Weekly	Enterococci	3	1	74	
Lakeville	Pilgrim Road	Three times	Enterococci	3	1	67	2
Lakeville	Ted Williams	Weekly	Enterococci	7	1	121	1
Lancaster	Camp Lowe Beach	Weekly	E. coli	10			
Lancaster	Lancaster Town Beach	Weekly	E. coli	11			
Lanesborough	Camp Mohawk Beach	Weekly	E. coli	8			
Lanesborough	Sunrise Beach	Weekly	E. coli	12			
Lee	Goose Pond	Weekly	E. coli	11			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Lee	Laurel Lake	Weekly	E. coli	12			
Lee	Laurel Lake	Weekly	Enterococci	19			
Lee	Sandy Beach	Weekly	E. coli	12	1	246	
Lenox	Laurel Lake	Weekly	E. coli	12			
Leverett	Ruggles Pond	Weekly	Enterococci	16			
Lexington	Old Reservoir Swim Area Right #1	Weekly	E. coli	1			
Lexington	Old Reservoir Swim Area Right #1	Weekly	Enterococci	17	5	98-204	
Lexington	Old Reservoir Swim Area Right #2	Weekly	E. coli	3			
Lexington	Old Reservoir Swim Area Right #2	Weekly	Enterococci	15	4	136-280	
Littleton	Littleton Town Beach	Weekly	E. coli	12			
Lowell	Merrimac River - Boat House	Weekly	E. coli	7			
Ludlow	Haviland Pond (ramp)	Three times	E. coli	3			
Ludlow	Haviland Pond (concession)	Three times	E. coli	6			
Ludlow	Haviland Pond (middle)	Three times	E. coli	8	1	1000	
Ludlow	Haviland Pond (restrooms)	Three times	E. coli	16	1	640	
Lunenburg	Lunenburg Town Beach	Weekly	E. coli	12	2	430-500	
Marlborough	Memorial - Left	Weekly	E. coli	12	1	350	
Marlborough	Memorial - Middle	Weekly	E. coli	12			
Marlborough	Memorial - Right	Weekly	E. coli	12	1	1190	
Mashpee	Attaquin	Weekly	E. coli	12			
Mashpee	Camp Farley - Wakeby Pond	Weekly	E. coli	12			
Mashpee	John's Pond (Briarwood)	Weekly	E. coli	13			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Mashpee	John's Pond (North)	Weekly	E. coli	4			
Mashpee	John's Pond (Public)	Weekly	E. coli	11			
Mashpee	Santuit Pond	Weekly	E. coli	12			
Medford	Wrights Pond - Deep End	Weekly	E. coli	13	1	1100	1
Medford	Wrights Pond - Shallow End	Weekly	E. coli	13	1	860	1
Medway	Choate Pond (left)	Weekly	E. coli	12	2	270-320	2
Medway	Choate Pond (right)	Weekly	E. coli	14	3	240-560	2
Mendon	Town Beach	Weekly	E. coli	12			
Merrimac	Indian Head Park - 25 feet out	Weekly	E. coli	7			
Merrimac	Indian Head Park - 50 feet out	Weekly	E. coli	7			
Methuen	Forest Lake - Center	Weekly	E. coli	12	1	326	
Methuen	Forest Lake - North Ramp	Weekly	E. coli	12			
Methuen	Forest Lake - Right	Weekly	E. coli	23	2	326-2419	
Methuen	Forest Lake - South Ramp	Weekly	E. coli	12	1	462	
Middleborough	Camp Avoda	Weekly	E. coli	9	1	1024	
Middleborough	Camp Yomechas	Weekly	E. coli	18	2	280-308	
Middleborough	Woods Pond Cabins	Weekly	E. coli	19	1	280	
Milton	MDC - Houghton's Pond @ Bathhouse	Weekly	Enterococci	13	1	136	
Monterey	Benedict Pond Beach	Weekly	Enterococci	19	4	70-328	
Monterey	Camp Half Moon	Weekly	E. coli	8			
Monterey	Lake Garfield	Weekly	E. coli	16			
Monterey	The Seven Stones Beach	Weekly	E. coli	16			
Mt. Washington	Camp Hi Rock - Bear Rock Beach	Weekly	E. coli	6			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Mt. Washington	Camp Hi Rock - Main Beach	Weekly	E. coli	15			
Nantucket	Miacomet Pond	Weekly	E. coli	6			
Nantucket	Sesachacha Pond	Weekly	E. coli	6			
New Bedford	Main Beach	Weekly	Enterococci	13	3	121-250	3
New Bedford	Sassaquin Ave	Weekly	Enterococci	13	1	250	1
New Marlborough	Camp Segowea	Weekly	E. coli	11			
Newton	Crystal Lake	Weekly	E. coli	10			
Newton	Crystal Lake	Weekly	Enterococci	10	2	120-120	
North Adams	Windsor Lake	Weekly	E. coli	6			
North Andover	Berry Pond Beach	Weekly	Enterococci	16			
North Andover	Frye Pond Beach	Weekly	Enterococci	17	2	480-600	2
North Andover	Stevens Pond - Center	Weekly	E. coli	10			
North Andover	Stevens Pond - Left	Weekly	E. coli	13	1	295	1
North Andover	Stevens Pond - Right	Weekly	E. coli	13			
North Attleboro	Falls Pond	Weekly	E. coli	22	3	370-940	
North Attleboro	Whittings Pond	Weekly	E. coli	35	18	240-2200	
Northampton	Clear Falls	Weekly	E. coli	14			
Northampton	Musante Beach	Weekly	E. coli	14			
Northbridge	Heritage Park	Weekly	E. coli	14			
Northbridge	Hickory Hill - Girl Scouts	Weekly	E. coli	16			
Northbridge	Memorial Beach	Weekly	E. coli	7			
Oakham	Lake Dean - Dean Campground	Weekly	E. coli	15			
Oakham	Lake Dean - Pine Acres Campground	Weekly	E. coli	14			
Orange	Matawa Beach	Weekly	E. coli	9			
Otis	Camp Bonnie Brae	Weekly	E. coli	12			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Otis	Camp Nawaka	Weekly	E. coli	11			
Otis	Camp Overflow Beach	Weekly	E. coli	16			
Otis	Otis Reservoir Beach	Weekly	Enterococci	16			
Otis	Otis Woodlands (beach)	Weekly	E. coli	19			
Otis	Otis Woodlands (picnic grove)	Weekly	E. coli	19			
Otis	Otis Woodlands (Weir)	Weekly	E. coli	19			
Pembroke	Finn Camp	Weekly	E. coli	14			
Pembroke	Furnace Colony	Weekly	E. coli	13	1	400	
Pembroke	Hobomoc Pond	Weekly	E. coli	14			
Pembroke	Little Sandy	Weekly	E. coli	15	1	255	
Pembroke	Oldham	Weekly	E. coli	15			
Pembroke	Stetson	Weekly	E. coli	15	1	940	
Peru	Camp Danbee	Weekly	E. coli	11			
Pittsfield	Lulu Pond Beach	Weekly	Enterococci	8			
Plymouth	Barrett Pond	Weekly	Enterococci	9			
Plymouth	Blueberry Hill Camp - Curlew Pond	Weekly	E. coli	15			
Plymouth	Camp Clark YMCA - Hyles Pond	Weekly	E. coli	10			
Plymouth	Camp Dennen - Hedges Pond	Weekly	E. coli	13			
Plymouth	Camp Massasoit - Elbow Pond	Weekly	E. coli	12			
Plymouth	Charge Pond	Weekly	Enterococci	8			
Plymouth	College Pond Day Use	Weekly	Enterococci	9			
Plymouth	Curlew Pond	Weekly	Enterococci	8			
Plymouth	Ellis Haven - Ellis Pond	Weekly	E. coli	15			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Plymouth	Ellis Haven - Swimming Hole	Weekly	E. coli	13			
Plymouth	Fearing Pond	Weekly	Enterococci	9			
Plymouth	Fresh Pond - End Pond	Weekly	E. coli	11			
Plymouth	Fresh Pond - Mid Pond	Weekly	E. coli	11			
Plymouth	Indian Head	Weekly	E. coli	14	1	1000	
Plymouth	Main Water Front - Cachalot	Weekly	E. coli	9			
Plymouth	Main Water Front - Squanto	Weekly	E. coli	9			
Plymouth	Main Water Front - Wind-in-the-Pines Day Camp	Weekly	E. coli	9			
Plymouth	Morton Park - Boy's Swimming Hole	Weekly	E. coli	10	2	1000-2000	
Plymouth	Morton Park - Left	Weekly	E. coli	8			
Plymouth	Morton Park - Middle	Weekly	E. coli	8			
Plymouth	Morton Park - Red Springs	Weekly	E. coli	8			
Plymouth	Morton Park - Right	Weekly	E. coli	8			
Plymouth	Pinewood Camp - Camphouse Beach	Weekly	E. coli	12			
Plymouth	Pinewood Camp - Crew Dock	Weekly	E. coli	12			
Plymouth	Pinewood Camp - Pinecones Beach	Weekly	E. coli	12			
Plymouth	Pinewood Lodge - Fresh Meadow	Weekly	E. coli	14	1	365	
Plymouth	Plymouth Estates	Weekly	E. coli	13			
Plymouth	Sandy Pond	Weekly	E. coli	12			
Richmond	Camp Marion White	Weekly	E. coli	16			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Richmond	Camp Russell	Weekly	E. coli	9			
Richmond	Richmond Shores - East	Weekly	E. coli	12			
Richmond	Richmond Town Beach	Weekly	E. coli	12			
Rochester	Perry's Camp	Weekly	Enterococci	8			
Rochester	Snipituit Pond	Weekly	Enterococci	9	3	66-256	
Rowe	Rowe Beach - Center	Weekly	E. coli	15			
Rowe	Rowe Beach - Inlet	Weekly	E. coli	15			
Rowe	Rowe Beach - Right	Weekly	E. coli	16			
Russell	H.A. Moses Beach	Weekly	E. coli	9			
Rutland	Whitehall Pond Beach	Weekly	Enterococci	17	1	88	
Sandisfield	York Lake Beach	Weekly	Enterococci	16			
Sandwich	Camp Good News	Weekly	E. coli	7			
Sandwich	Dunraomin Trailer Park	Weekly	E. coli	7			
Sandwich	Hoxie Pond	Weekly	E. coli	12			
Sandwich	Lakefield Farms	Weekly	E. coli	7			
Sandwich	Lakewood Hills Property Owners Assoc.	Weekly	E. coli	6			
Sandwich	Lawrence Pond	Weekly	E. coli	13			1
Sandwich	Lawrence Pond Mobile Home Park	Weekly	E. coli	7			
Sandwich	Peter's Pond	Weekly	E. coli	11			
Sandwich	Peter's Pond Park (boat ramp)	Weekly	E. coli	13			
Sandwich	Peter's Pond Park (playground)	Weekly	E. coli	12			
Sandwich	Pimlico Pond	Weekly	E. coli	11			
Sandwich	Rolling Ridge Homeowners Assoc.-Lawrence Pond	Three times	E. coli	3			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Sandwich	Snake Pond	Weekly	E. coli	11			
Sandwich	Spectacle Pond	Once	E. coli	1			
Sandwich	Triangle Pond	Weekly	E. coli	12			
Sandwich	Wakeby Pond	Weekly	E. coli	11			
Saugus	MDC - Pearce Lake @ Breakheart	Daily	Enterococci	57	1	84	
Saugus	MDC - Pecham Pond @ Camp Nihan	Daily	Enterococci	57	3	68-320	
Savoy	North Pond Beach	Weekly	Enterococci	17	1	248	1
Savoy	South Pond Beach	Weekly	Enterococci	16	2	154-250	
Sharon	Boat Landing Area	Twice per week	E. coli	28			
Sharon	Camp Gannett Beach	Weekly	E. coli	7			
Sharon	Camp Gannett Israel Beach	Weekly	E. coli	6			
Sharon	Camp Wonderland Beach	Weekly	E. coli	7			
Sharon	Community Center Beach	Twice per week	E. coli	28	3	330-350	3
Sharon	Horizons for Youth Beach	Weekly	E. coli	7			
Sharon	Town Beach - Boat Landing	Twice per week	E. coli	27			
Sharon	Town Beach - Concession	Twice per week	E. coli	29			
Sharon	Town Beach - Docks	Twice per week	E. coli	28			
Sheffield	Berkshire School Beach	Weekly	E. coli	10			
Shrewsbury	Sunset Beach	Weekly	E. coli	12			
Shutesbury	Lake Wyola	Weekly	Enterococci	19	5	70-600	1
Southwick	South Pond Beach - South	Weekly	E. coli	7	1	380	1
Spencer	Camp Marshall - Thompson	Weekly	E. coli	11			
Spencer	Howe Pond Beach	Three times	Enterococci	3			
Spencer	Lake Whittenmore	Weekly	E. coli	11			
Spencer	Stiles - Camp Larel Wood	Weekly	E. coli	13			
Springfield	Lake Lorraine	Weekly	Enterococci	24	7	74-430	3

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Sterling	Lake Waushacum #1	Weekly	E. coli	18			
Sterling	Lake Waushacum #2	Weekly	E. coli	18			
Sterling	Lake Waushacum #3	Weekly	E. coli	4			
Stockbridge	Beachwood Assoc. - Stockbridge Bowl (inlet)	Weekly	E. coli	3			
Stockbridge	Beachwood Assoc. - Stockbridge Bowl	Weekly	E. coli	12			
Stockbridge	Berkshire Country Day School	Weekly	E. coli	18			
Stockbridge	Camp Mahkeenac	Weekly	E. coli	24			
Stockbridge	Kripalu	Weekly	E. coli	13	3	236-500	
Stockbridge	Mahkeenac Shores	Weekly	E. coli	11			
Stockbridge	Sports School Day Camp	Weekly	E. coli	10	1	236	
Stockbridge	Stockbridge Bowl	Weekly	E. coli	14	1	236	
Stockbridge	Tanglewood	Weekly	E. coli	10			
Stockbridge	White Pines	Twice	E. coli	2			
Stoughton	Ames Pond	Weekly	E. coli	23	4	340-790	1
Sturbridge	Walker Pond	Weekly	Enterococci	26	6	68-400	1
Sutton	Camp Blanchard	Weekly	E. coli	6	1	270	
Sutton	Camp Marion	Weekly	E. coli	10			
Sutton	King's Campground	Weekly	E. coli	12			
Sutton	Old Holbrook Campground	Weekly	E. coli	11			
Sutton	Sutton Falls Camp	Weekly	E. coli	13	2	780-2000	
Taunton	Campers Beach / Middle Pond	Weekly	Enterococci	5			
Taunton	Watsons Pond	Weekly	Enterococci	6			
Templeton	Beamans Pond	Weekly	Enterococci	22	3	70-600	3

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Templeton	Beamans Pond Campground	Weekly	Enterococci	24	5	70-200	2
Tisbury	Long Cove (fresh)	Weekly	E. coli	5			
Tisbury	Tisbury Great Pond	Weekly	E. coli	5			
Tolland	Camp Kinderland Beach	Weekly	E. coli	10			
Tolland	Camp Timbertrails	Weekly	E. coli	12			
Tolland	Twin-Brook Camping Area	Weekly	E. coli	5			
Townsend	Pearl Hill Pond Beach	Weekly	Enterococci	19	1	70	
Townsend	Townsend Town Beach	Weekly	E. coli	15	6	260-600	2
Tyringham	Tyringham Park Beach	Weekly	E. coli	12			
Upton	Pratt Pond	Weekly	E. coli	12	1	420	
Upton	Taft Pond Beach	Weekly	E. coli	11			
Upton	Wildwood Bond Beach	Weekly	E. coli	12	1	600	1
Uxbridge	Buffumville Lake	Weekly	E. coli	17	1	250	
Uxbridge	Fairwoods	Weekly	E. coli	10	2	400-700	
Uxbridge	Tully Lake - Campground	Weekly	E. coli	18			
Uxbridge	West Hill Park	Weekly	E. coli	18	3	320-760	
Wales	Lake Land	Three times	E. coli	3	1	900	
Wales	Sichol	Twice	E. coli	2			
Wales	Town Beach	Weekly	E. coli	4			
Walpole	Pond/Dock Area	Weekly	E. coli	9			
Wareham	Glen Charlie at Shangri-La	Weekly	Fecal Coliform	9			
Wareham	Glen Charlie at Sunset	Weekly	Fecal Coliform	9			
Warren	Comin's Pond	Weekly	E. coli	4			
Wayland	Lake Cochituate - Left Buoy (deep)	Weekly	E. coli	12			
Wayland	Lake Cochituate - Left Shallow	Weekly	E. coli	12			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Wayland	Lake Cochituate - Middle	Weekly	E. coli	12			
Wayland	Lake Cochituate - Middle	Weekly	Enterococci	24	6	76-600	2
Wayland	Lake Cochituate - Right Shallow	Weekly	E. coli	12			
Wayland	Lake Cochituate - Right Shallow	Weekly	Enterococci	24	7	80-600	2
Webster	Beacon Park	Weekly	E. coli	13			
Webster	Birch Island	Twice	E. coli	2			
Webster	Colonial Park	Weekly	E. coli	13			
Webster	Indian Ranch	Weekly	E. coli	9			
Webster	Kildeer Island	Weekly	E. coli	12			
Webster	Lakeside	Weekly	E. coli	13			
Webster	Memorial Beach #1	Weekly	E. coli	14			
Webster	Memorial Beach #2	Weekly	E. coli	14			
Webster	Point Breeze	Once	E. coli	1			
Webster	Treasure Island	Weekly	E. coli	13			
Wellesley	Morses Beach - Deep	Weekly	E. coli	17			
Wellesley	Morses Beach - Shallow	Weekly	E. coli	35			
Wellfleet	Duck Pond	Weekly	E. coli	10	1	264	1
Wellfleet	Dyer Pond	Weekly	E. coli	10			
Wellfleet	Great Pond	Weekly	E. coli	10			
Wellfleet	Gull Pond	Weekly	E. coli	10			
Wellfleet	Herring Pond	Weekly	E. coli	9			1
Wellfleet	Higgins Pond	Weekly	E. coli	9			
Wellfleet	Long Pond	Weekly	E. coli	10			
Wellfleet	Spectacle Pond	Weekly	E. coli	5			
Wenham	Gull Pond	Weekly	E. coli	7			
Wenham	Gull Pond	Weekly	Fecal Coliform	1			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Wenham	Pleasant Street Pond	Weekly	E. coli	17	4	260-380	1
West Stockbridge	Camp Kingsmont	Weekly	E. coli	11			
West Stockbridge	Card Pond Beach	Weekly	E. coli	16			
West Stockbridge	Crane Lake Camp	Weekly	E. coli	10			
West Tisbury	Seth's Pond #1	Three times	E. coli	2			
West Tisbury	Seth's Pond #1	Three times	Enterococci	1			
West Tisbury	Seth's Pond #2	Three times	E. coli	2			
West Tisbury	Seth's Pond #2	Three times	Enterococci	1			
West Tisbury	Seth's Pond Beach #1 (Focus)	Weekly	E. coli	7			
West Tisbury	Seth's Pond Cove #2 (Focus)	Weekly	E. coli	6			
Westborough	Lake Chauncy Beach #1	Weekly	E. coli	11			1
Westfield	Kingsley	Weekly	Enterococci	16	1	66	1
Westfield	Lambert's	Weekly	Enterococci	18	1	220	
Westford	East Boston Camps - Boys Beach	Weekly	E. coli	12			
Westford	East Boston Camps - Day Care	Weekly	E. coli	9			
Westford	Edwards Town Beach	Weekly	E. coli	13			
Westford	Forge Village Beach	Weekly	E. coli	21	2	240-330	1
Westford	Lakeside Meadows	Weekly	E. coli	15			
Westford	Long Sought For Pond (beach)	Weekly	E. coli	15			
Westford	Long Sought For Pond (Pond St)	Weekly	E. coli	1			
Westford	Marylou's Beach - NIA Beach	Weekly	E. coli	15			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Westford	Nashoba Ski Area - Day Campers Beach	Weekly	E. coli	15			
Westford	Nashoba Ski Area - Swim Club Beach	Weekly	E. coli	14			
Westford	Nashoba Ski Area - Swim Club Beach	Weekly	Enterococci	1			
Westford	North Beach - NIA Beach	Weekly	E. coli	15	1	240	
Westford	Sandy Beach - NIA Beach	Weekly	E. coli	15			
Westford	Wymans Campers Beach	Weekly	E. coli	15	1	320	
Westford	Wymans Main Beach - North	Weekly	E. coli	15			
Westford	Wymans Main Beach - South	Weekly	E. coli	15			
Westminster	Crow Hill Pond Beach	Weekly	Enterococci	17	2	70-94	1
Westport	Davol Pond	Weekly	Enterococci	11	2	250-250	
Westport	Sawdy Pond	Weekly	Enterococci	11	1	85	
Westport	South Watuppa Pond	Weekly	Enterococci	10	2	66-275	
Weymouth	Whitman's Pond	Weekly	E. coli	4			
Whitinsville	Heritage Drive	Weekly	E. coli	14			
Whitinsville	Northbridge	Weekly	E. coli	7			
Williamstown	Margaret Lindley Park	Weekly	E. coli	12			
Wilmington	Baby Beach	Weekly	E. coli	18			
Wilmington	Town Beach	Weekly	E. coli	39	5	375-1500	
Winchendon	Lake Dennison State Park (Day use)	Weekly	Enterococci	17	1	600	1
Winchendon	Lake Dennison State Park (East Camp)	Weekly	Enterococci	3			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Winchendon	Lake Dennison State Park (North Camp)	Weekly	Enterococci	17	1	380	1
Winchester	Sandy Beach	Weekly	Enterococci	23	8	66-790	
Winchester	Wedge Pond - North	Weekly	Fecal Coliform	9			
Winchester	Wedge Pond - South	Weekly	Fecal Coliform	9			
Worcester	Bell Pond Beach	Weekly	E. coli	8			
Worcester	Coes Pond Hillside	Weekly	E. coli	8	1	369	1
Worcester	Coes Pond Mill St. Beach	Weekly	E. coli	10	2	249-1975	
Worcester	Indian Lake Public Beach	Weekly	E. coli	9	1	399	1
Worcester	Indian Lake Shore Park	Weekly	E. coli	7			
Worcester	Lake Quinsigamond-Lake Park Beach	Weekly	E. coli	1			
Worcester	Lake Quinsigamond-Lake Park Beach	Weekly	Enterococci	16	1	106	
Worcester	Lake Quinsigamond-Regatta Point Beach	Weekly	E. coli	1			
Worcester	Lake Quinsigamond-Regatta Point Beach	Weekly	Enterococci	21	7	90-600	2
Worthington	Berkshire Parks Camp	Three times	E. coli	3			
Wrentham	Lake Archer	Weekly	E. coli	13			
Wrentham	Lake Pearl Boat Landing	Weekly	E. coli	14	1	950	
Wrentham	Lake Pearl Park	Weekly	E. coli	16	2	370	2
Wrentham	Mirror Lake	Weekly	E. coli	13	1	1100	
Wrentham	Sweatt Beach	Weekly	E. coli	14	1	270	
Yarmouth	Big Sandy Pond	Weekly	E. coli	15			
Yarmouth	Camp Greenough - Boy Scouts	Weekly	E. coli	9			
Yarmouth	Dennis Pond	Weekly	E. coli	12			

Table 17: Water quality data for freshwater public and semi-public bathing beaches in Massachusetts in 2003.

Community	Beach Names	Testing Frequency	Indicator Type	NumTests	# Exceedances	Range of Exceedances	Number of Postings
Yarmouth	Elijah's Pond, Camp Wingate	Weekly	E. coli	11			
Yarmouth	Flax Pond	Weekly	E. coli	14			
Yarmouth	Horse Pond	Weekly	E. coli	13			
Yarmouth	Horse Pond - Halcyon Condos	Weekly	E. coli	13			
Yarmouth	Little Sandy Pond	Weekly	E. coli	13			
Yarmouth	Long Pond - Indian	Weekly	E. coli	12			
Yarmouth	Long Pond - Lyman	Weekly	E. coli	12			

Postings for a beach were assumed to be for all parts of the beach with that name and were listed in that way

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Abington				x	x	
Acton				x	x	
Acushnet				x		x
Adams						
Agawam				x	x	
Alford						
Amesbury				x	x	x
Amherst				x		
Andover				x		x
Aquinnah	x	x				
Arlington				x	x	
Ashburnham				x	x	x
Ashby				x	x	
Ashfield				x	x	
Ashland				x	x	
Athol				x	x	
Attleboro						
Auburn				x		x
Avon						
Ayer				x	x	
Barnstable	x	x	x	x	x	x
Barre				x		x
Becket				x	x	
Bedford				x	x	
Belchertown				x	x	
Bellingham				x	x	

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Belmont						
Berkley						
Berlin						
Bernardston						
Beverly	x	x				
Billerica				x	x	
Blackstone						
Blandford						
Bolton				x	x	
Boston	x	x				
Bourne	x	x	x	x	x	x
Boxborough						
Boxford				x	x	
Boylston						
Braintree	x	x		x	x	
Brewster	x	x	x	x	x	x
Bridgewater						
Brimfield				x	x	
Brockton						
Brookfield				x	x	
Brookline						
Buckland						
Burlington						
Cambridge						
Canton						
Carlisle						
Carver				x		x
Charlemont				x	x	

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Charlton				x		x
Chatham	x	x	x	x	x	
Chelmsford				x	x	
Chelsea						
Cheshire				x		x
Chester						
Chesterfield				x	x	
Chicopee				x	x	
Chilmark	x	x				
Clarksburg				x	x	
Clinton						
Cohasset	x	x				
Colrain						
Concord				x	x	
Conway				x		x
Cummington				x	x	
Dalton						
Danvers	x	x				
Dartmouth	x	x	x	x	x	x
Dedham						
Deerfield						
Dennis	x	x	x	x	x	
Dighton						
Douglas				x	x	
Dover						
Dracut				x	x	
Dudley				x		x
Dunstable						

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Duxbury	x	x				
East Bridgewater						
East Brookfield				x	x	
East Longmeadow						
Eastham	x	x	x	x	x	x
Easthampton						
Easton				x	x	
Edgartown	x	x	x			
Egremont				x	x	
Erving				x		x
Essex	x	x		x	x	
Everett						
Fairhaven	x	x	x			
Fall River						
Falmouth	x	x	x	x	x	x
Fitchburg						
Florida				x	x	
Foxborough						
Framingham				x		x
Franklin				x	x	
Freetown				x		x
Gardner				x	x	
Georgetown				x	x	
Gill						
Gloucester	x	x				
Goshen				x	x	
Gosnold						
Grafton				x	x	

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Granby						
Granville						
Great Barrington				x	x	
Greenfield				x	x	
Groton				x	x	
Groveland						
Hadley						
Halifax				x	x	x
Hamilton						
Hampden						
Hancock						
Hanover						
Hanson				x	x	
Hardwick						
Harvard				x	x	
Harwich	x	x	x	x	x	x
Hatfield						
Haverhill				x	x	
Hawley						
Heath						
Hingham	x	x				
Hinsdale				x	x	
Holbrook						
Holden				x	x	
Holland						
Holliston				x	x	
Holyoke						
Hopedale				x		x

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Hopkinton				x	x	x
Hubbardston				x	x	
Hudson				x	x	
Hull	x	x	x			
Huntington				x	x	x
Ipswich	x	x		x	x	
Kingston	x	x		x		x
Lakeville				x	x	
Lancaster				x	x	
Lanesborough				x	x	x
Lawrence						
Lee				x	x	
Leicester						
Lenox				x	x	
Leominster				x		
Leverett				x	x	
Lexington				x	x	x
Leyden						
Lincoln						
Littleton				x	x	
Longmeadow						
Lowell				x	x	
Ludlow				x	x	
Lunenburg				x	x	
Lynn	x	x	x	x		x
Lynnfield						
Malden						
Manchester-by-the-	x	x				

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Sea						
Mansfield						
Marblehead	x	x	x			
Marion	x	x				
Marlborough				x	x	
Marshfield	x	x				
Mashpee	x	x	x	x	x	x
Mattapoisett	x	x	x			
Maynard						
Medfield				x		x
Medford				x	x	x
Medway				x	x	
Melrose						
Mendon				x	x	
Merrimac				x	x	
Methuen				x	x	
Middleborough				x	x	
Middlefield						
Middleton				x		x
Milford						
Millbury						
Millis						
Millville						
Milton				x	x	
Monroe						
Monson						
Montague						
Monterey				x	x	

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Montgomery						
Mount Washington				x	x	
Nahant	x	x				
Nantucket	x	x	x	x	x	x
Natick				x		x
Needham						
New Ashford						
New Bedford	x	x	x	x	x	x
New Braintree						
New Marlborough				x	x	
New Salem						
Newbury	x	x				
Newburyport	x	x				
Newton				x	x	
Norfolk						
North Adams				x	x	
North Andover				x	x	
North Attleborough				x	x	
North Brookfield				x		
North Reading						
Northampton				x	x	
Northborough						
Northbridge				x	x	
Northfield						
Norton				x		x
Norwell						
Norwood						
Oak Bluffs	x	x	x			

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Oakham				x	x	
Orange				x	x	
Orleans	x	x	x	x		x
Otis				x	x	
Oxford				x		x
Palmer						
Paxton						
Peabody						
Pelham						
Pembroke				x	x	
Pepperell						
Peru				x	x	
Petersham						
Phillipston						
Pittsfield				x	x	x
Plainfield				x		
Plainville						
Plymouth	x	x	x	x	x	x
Plympton						
Princeton						
Provincetown	x	x	x			
Quincy	x	x	x			
Randolph				x		x
Raynham						
Reading						
Rehoboth						
Revere	x	x				
Richmond				x	x	x

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Rochester				x	x	
Rockland				x		x
Rockport	x	x				
Rowe				x	x	
Rowley						
Royalston				x		x
Russell				x	x	
Rutland				x	x	
Salem	x	x	x			
Salisbury	x	x				
Sandisfield				x	x	
Sandwich	x	x	x	x	x	
Saugus				x	x	x
Savoy				x	x	
Scituate	x	x	x			
Seekonk						
Sharon				x	x	
Sheffield				x	x	
Shelburne						
Sherborn				x		
Shirley				x		x
Shrewsbury				x	x	
Shutesbury				x	x	
Somerset	x	x	x			
Somerville						
South Hadley						
Southampton						
Southborough						

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Southbridge						
Southwick				x	x	x
Spencer				x	x	x
Springfield				x	x	x
Sterling				x	x	
Stockbridge				x	x	x
Stoneham						
Stoughton				x	x	
Stow				x		x
Sturbridge				x	x	x
Sudbury						
Sunderland						
Sutton				x	x	x
Swampscott	x	x	x			
Swansea	x	x				
Taunton				x	x	
Templeton				x	x	
Tewksbury				x		x
Tisbury	x	x	x	x	x	
Tolland				x	x	
Topsfield				x		x
Townsend				x	x	
Truro	x	x	x			
Tyngsborough				x		x
Tyringham				x	x	
Upton				x	x	
Uxbridge				x	x	
Wakefield						

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Wales				x	x	
Walpole				x	x	
Waltham						
Ware						
Wareham	x	x	x	x	x	
Warren				x	x	x
Warwick						
Washington						
Watertown						
Wayland				x	x	
Webster				x	x	x
Wellesley				x	x	x
Wellfleet	x	x	x	x	x	
Wendell				x		
Wenham				x	x	
West Boylston						
West Bridgewater						
West Brookfield				x		x
West Newbury						
West Springfield						
West Stockbridge				x	x	
West Tisbury	x	x	x	x	x	
Westborough				x	x	x
Westfield				x	x	x
Westford				x	x	
Westhampton				x		x
Westminster				x	x	
Weston						

Table 18: Cities/towns in Massachusetts, indicating type of beach and the presence or absence of data in 2003.

Community	Marine Beach	Marine Beach with Data	Marine Beaches Without Data	Freshwater Beach	Freshwater Beach with Data	Freshwater Beach without Data
Westport	x	x	x	x	x	
Westwood				x		x
Weymouth	x	x		x	x	x
Whitinsville				x	x	
Whately						
Whitman						
Wilbraham				x		x
Williamsburg						
Williamstown				x	x	
Wilmington				x	x	
Winchendon				x	x	x
Winchester				x	x	
Windsor				x		x
Winthrop	x	x				
Woburn						
Worcester				x	x	
Worthington				x	x	x
Wrentham				x	x	
Yarmouth	x	x	x	x	x	

Table 19: Beach season (June – August) rainfall data for Boston, 2001-2003*

	Boston				
	Rainfall	June	July	August	Totals
2001	Total	4.99	2.13	4.14	11.26
	Dev From Norm	1.90	-0.71	0.90	2.09
2002	Total	4.78	1.42	2.13	8.33
	Dev From Norm	1.69	-1.42	-1.11	-0.84
2003	Total	4.69	2.11	3.02	9.82
	Dev From Norm	1.47	-0.95	-0.36	0.16

Table 20: Beach season (June – August) rainfall data for Chatham, 2001-2003*

	Chatham				
	Rainfall	June	July	August	Totals
2001	Total	3.00	3.35	5.36	11.71
	Dev From Norm	-0.44	-0.02	2.02	1.56
2002	Total	2.88	0.48	2.45	5.81
	Dev From Norm	-0.56	-2.89	-0.89	-4.34
2003	Total	5.07	1.78	3.46	10.31
	Dev From Norm	1.63	-1.59	0.12	0.16

* Rainfall data obtained from the National Weather Service's Forecast Office website for the Boston area, located at <http://www.erh.noaa.gov/er/box/dailystns.shtml>

Table 21: 2003 Marine Beach samples, exceedance and proximity to known pollution sources

Sample Sites	2003 Samples	2003 Exceedances	% Exceedance
Near Pollution Sources	1354	103	8
No Known Pollution Source	6085	207	3
Total	7439	310	4

Table 22: Time of day when samples were collected at public and semi-public bathing beaches in Massachusetts in 2003

Time of Sample	Marine		Fresh	
	# Samples	% Samples	# Samples	% Samples
Before 10:00 AM or after 4:00 PM	3904	52	3242	50
Between 10:00 AM and 4:00 PM	3535	48	3250	50
Total	7439	100	6492	100

Table 23: Sources of pollution for marine public and semi-public bathing beaches in Massachusetts, identified as part of an MDPH GPS survey of marine beaches conducted in 2003.

Marine beaches		
Pollution Source(s) found	# Sampling Sites	# Pollution Sources
Yes	104	195
No	700	0
Total	804	195

X. FIGURES

Figure 1:
All Massachusetts cities/towns grouped by type of public/semi-public bathing beach.

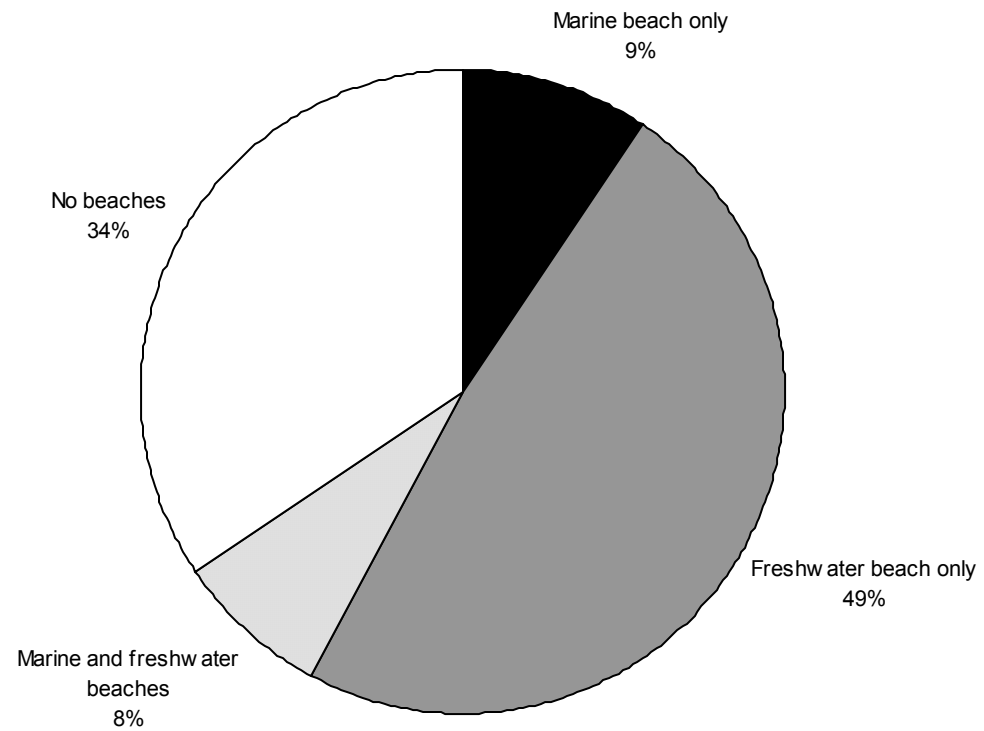


Figure 2:
Coastal cities/towns in Massachusetts grouped by presence or absence
of public/semi-public marine beaches and testing data 2003

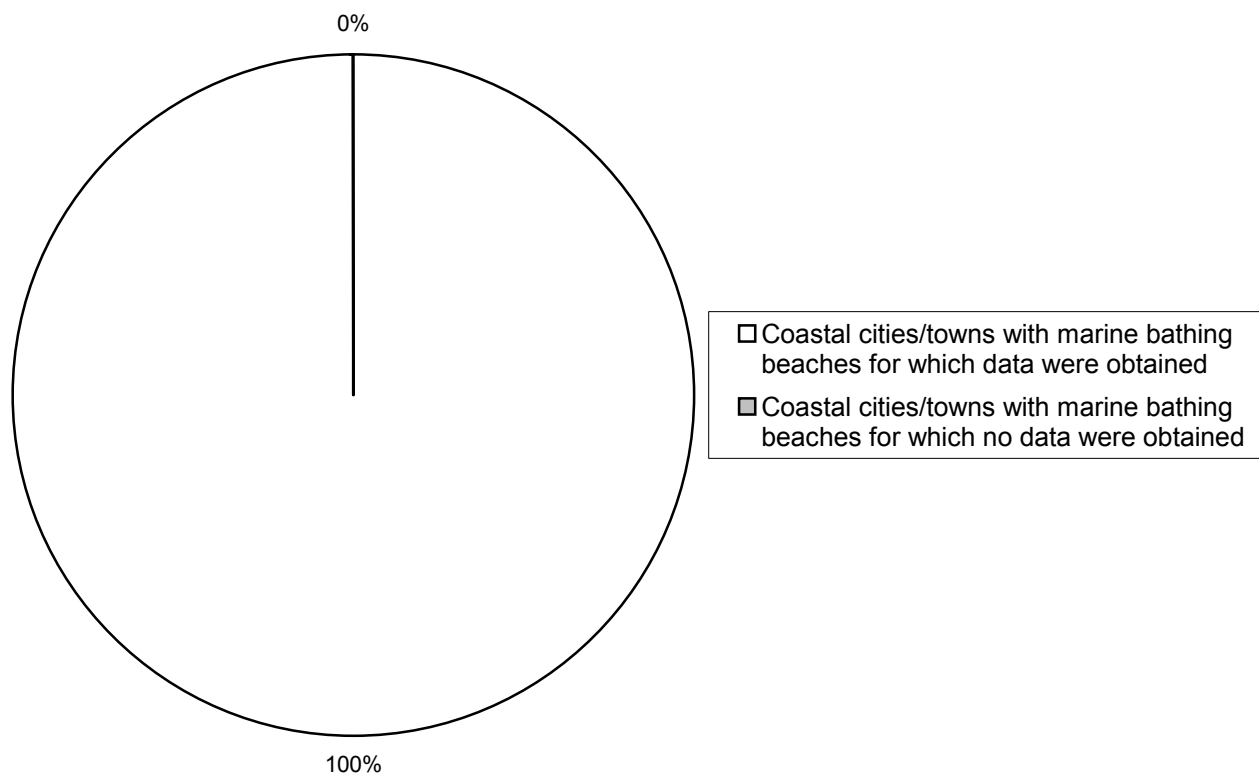


Figure 3
Cities/towns in Massachusetts grouped by presence or absence of public/semi-public
freshwater bathing beaches and testing data

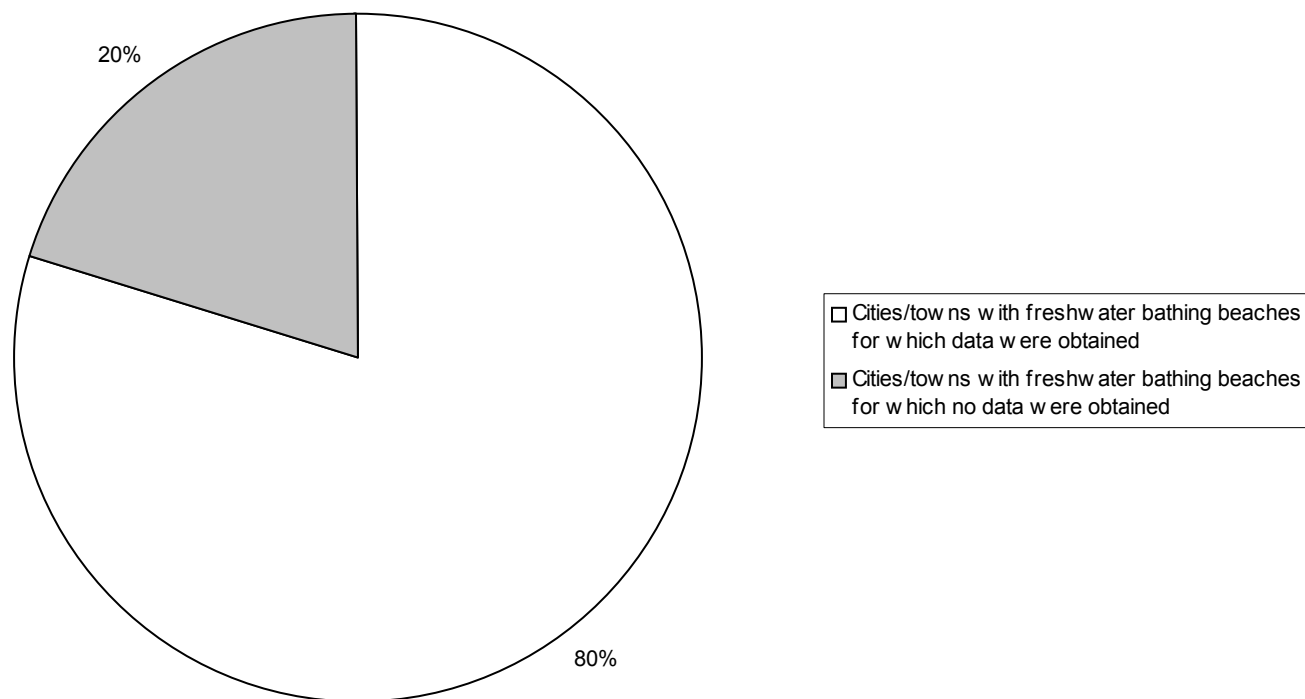


Figure 4:
Bather density at public/semi-public marine bathing beaches at times of water sampling

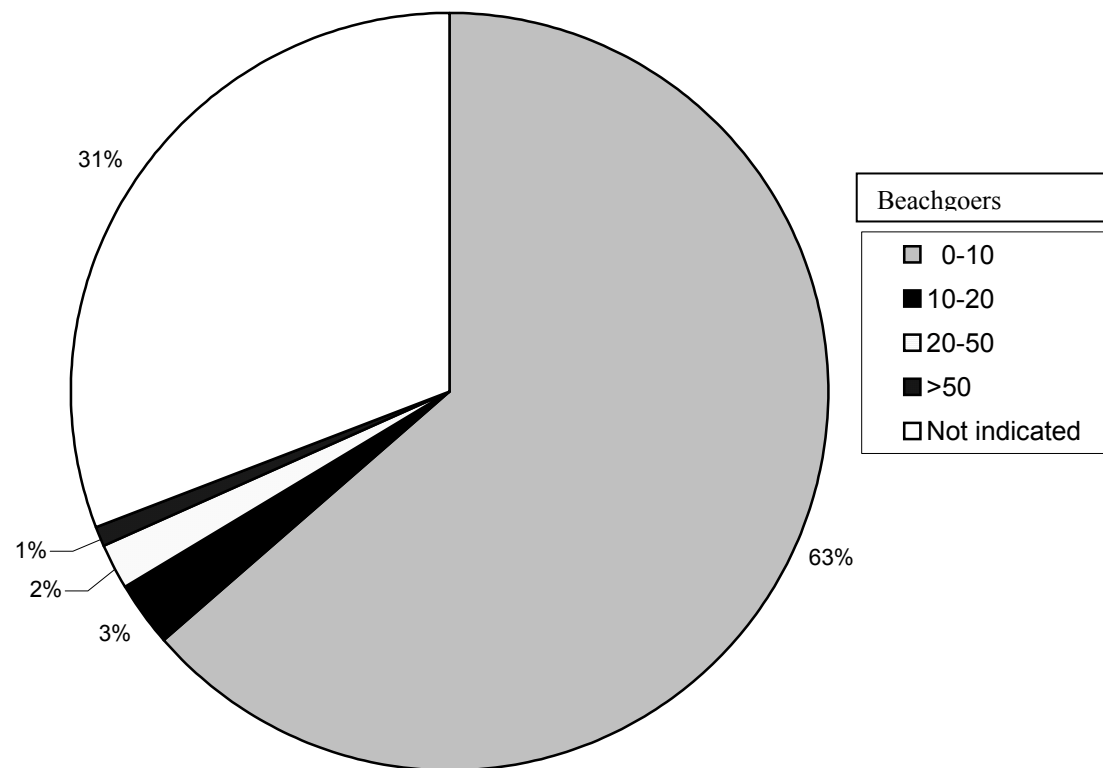


Figure 5:
Bather density at public/semi-public freshwater bathing beaches at times of sampling 2003

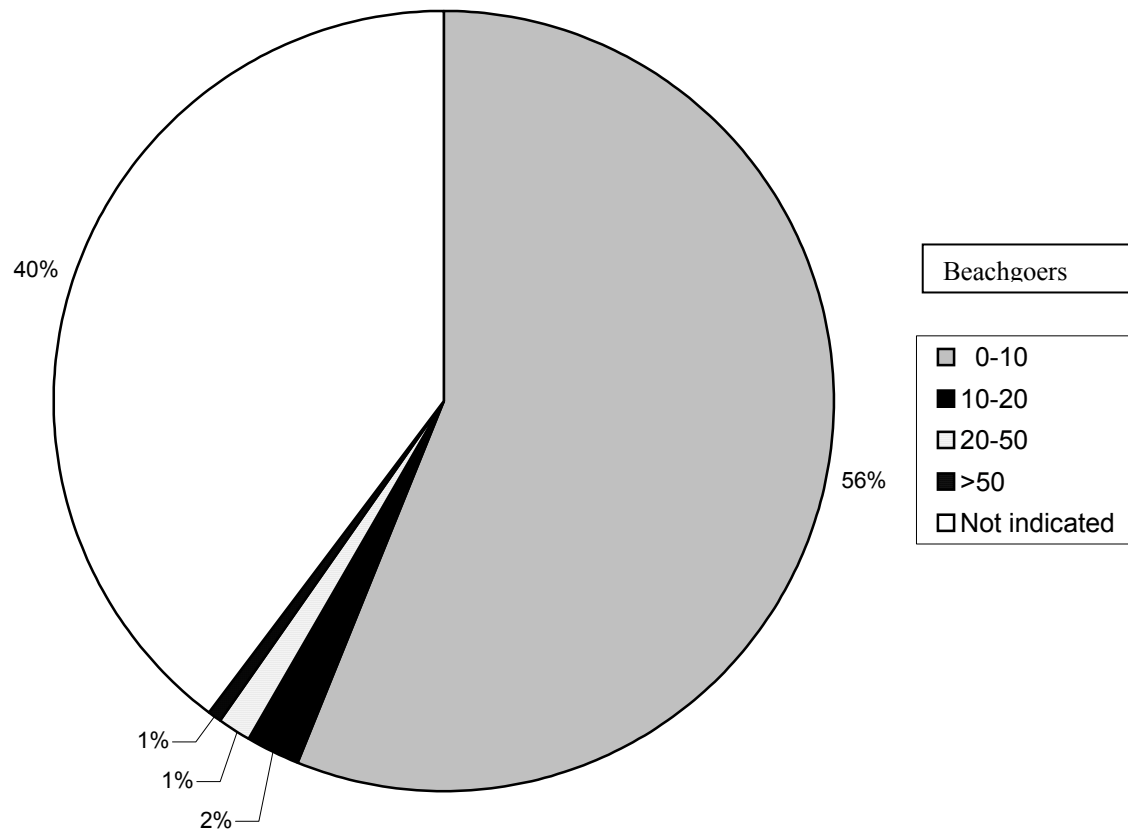


Figure 6:
Water quality indicators used to test public and semi-public marine bathing beaches in
Massachusetts 2003

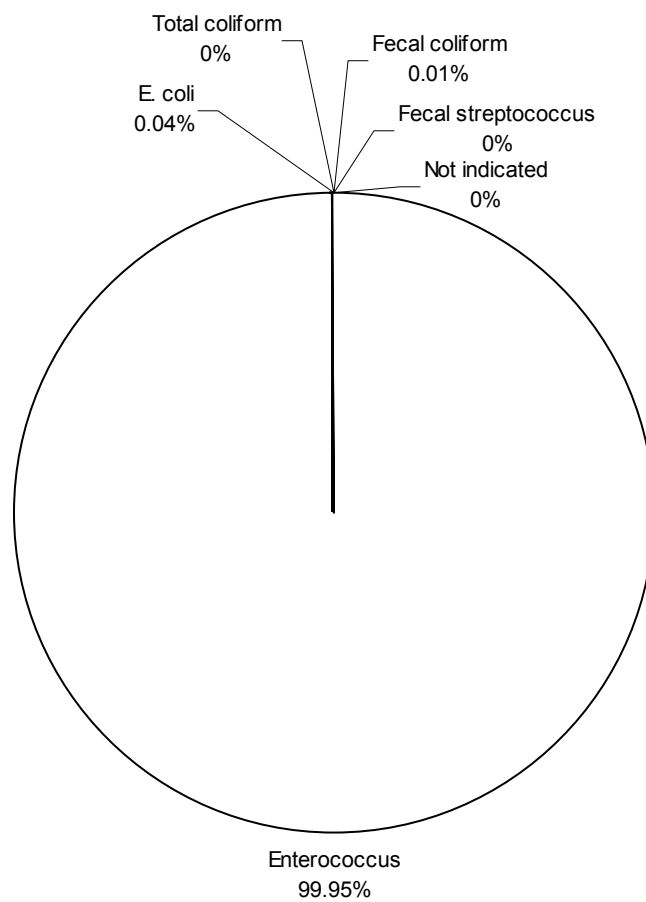


Figure 7:
Water quality indicators used to test public/semi-public freshwater bathing beaches in
Massachusetts 2003

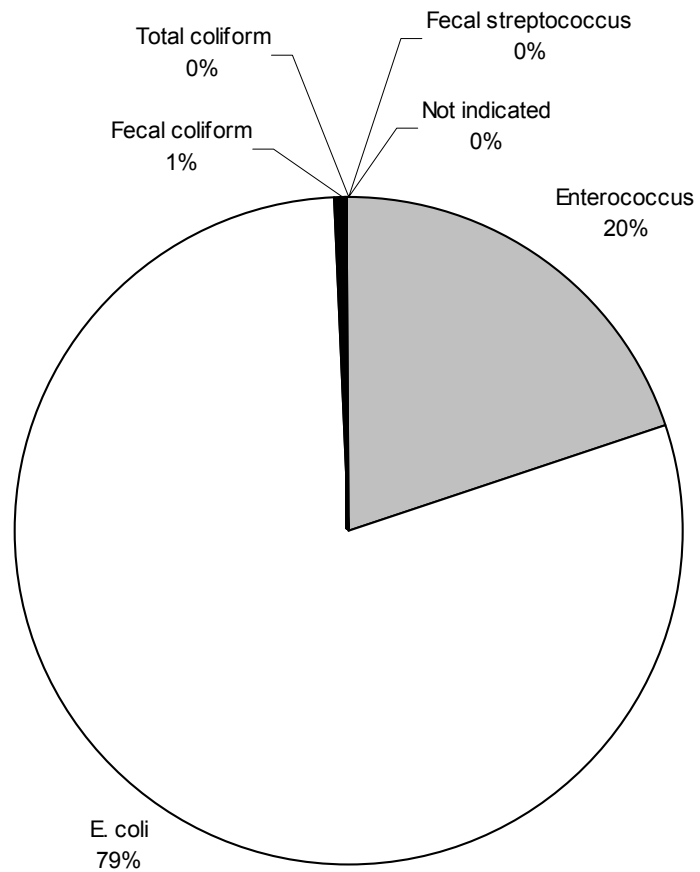


Figure 8:
Frequency of water quality testing at public/semi-public marine bathing beaches in
Massachusetts 2003

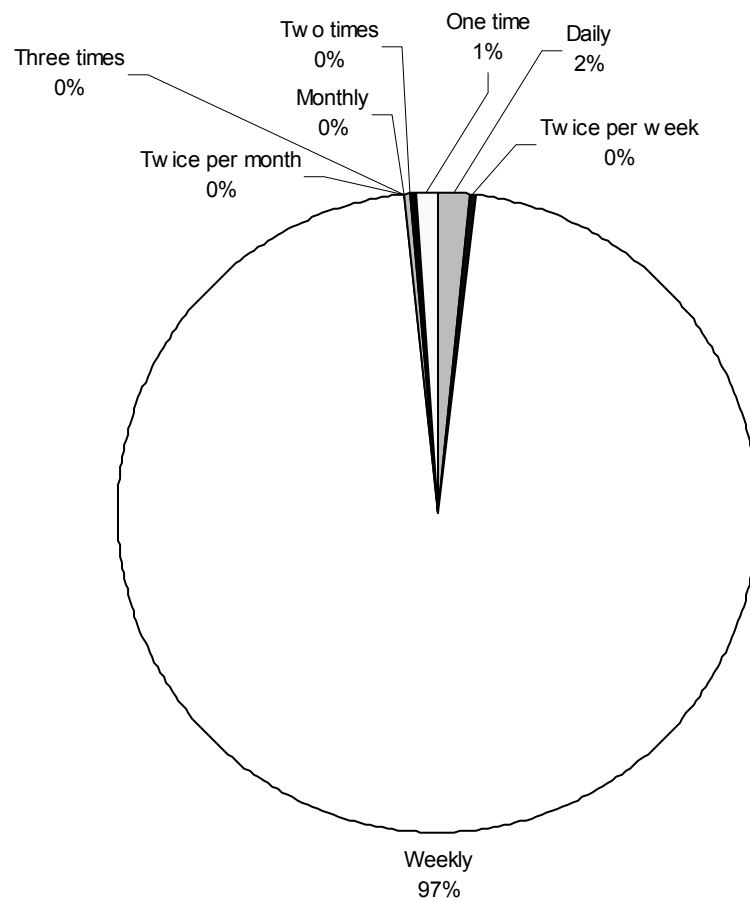


Figure 9:
Frequency of water quality testing at public/semi-public freshwater bathing beaches in
Massachusetts 2003

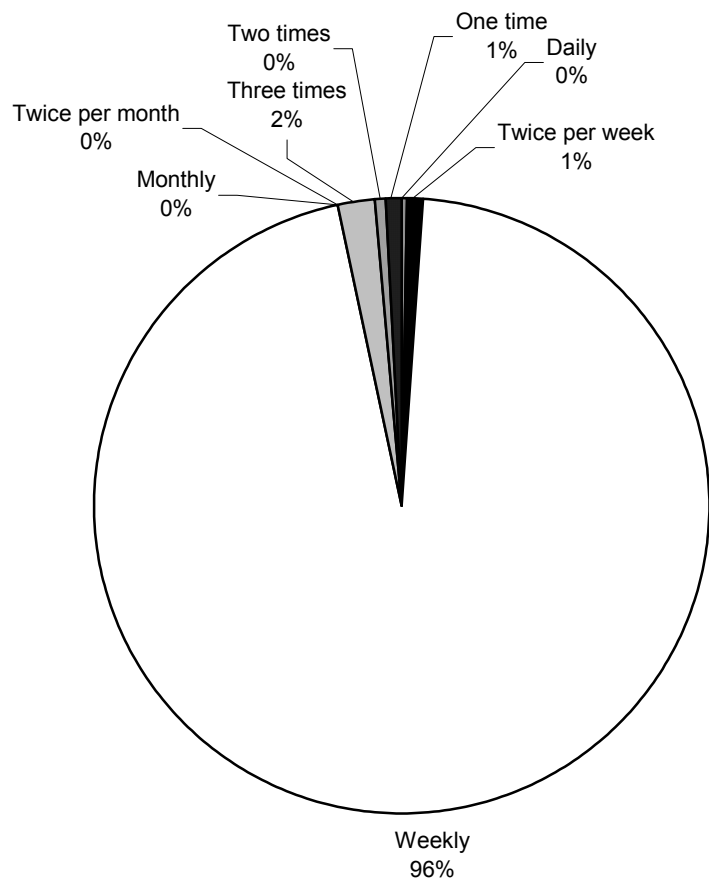


Figure 10:
Water quality samples at public/semi-public marine bathing beaches in Massachusetts
2003

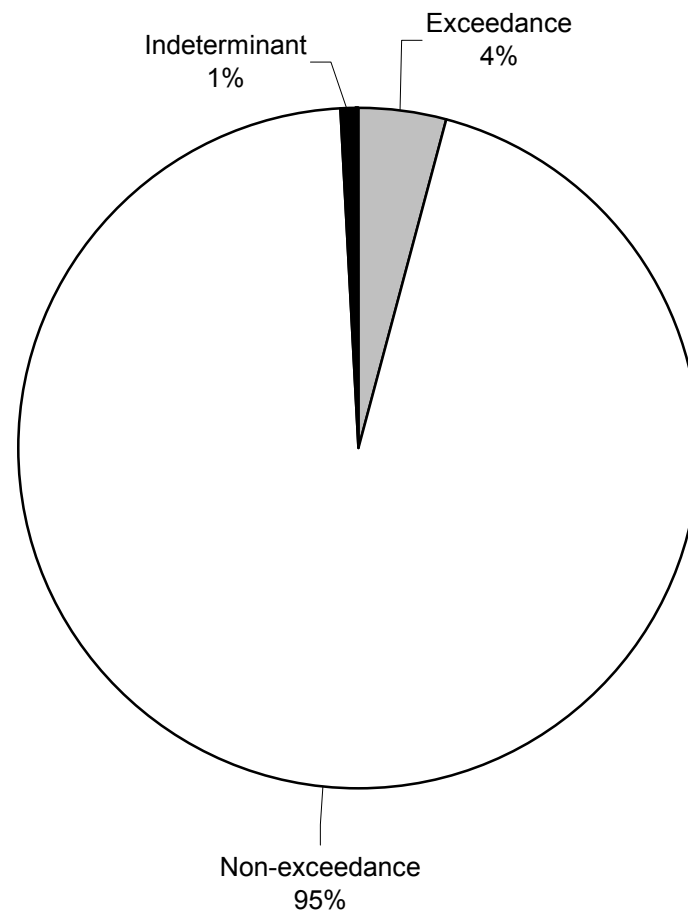


Figure 11:
Water quality samples at public/semi-public freshwater bathing beaches in Massachusetts
2003

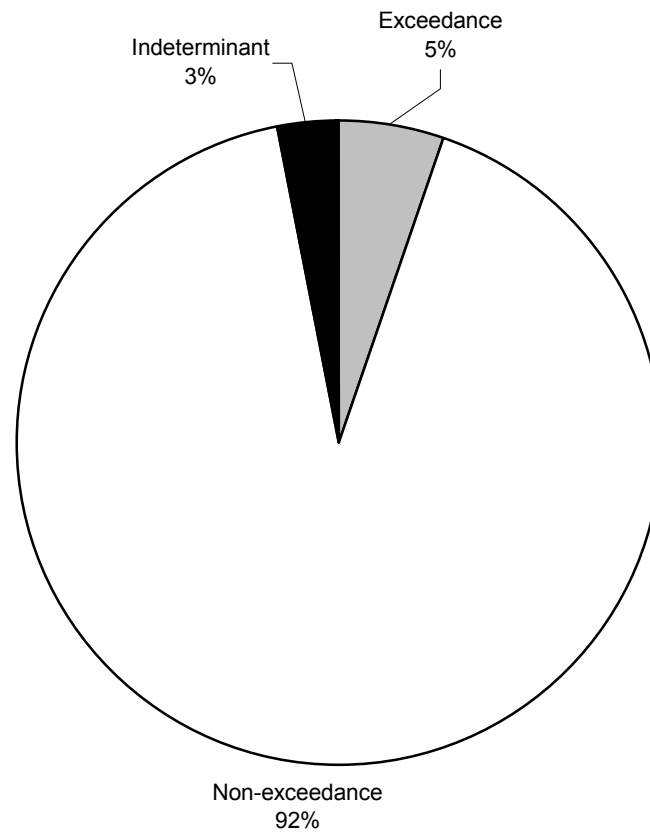


Figure 12. Marine beach towns that reported data in 2003

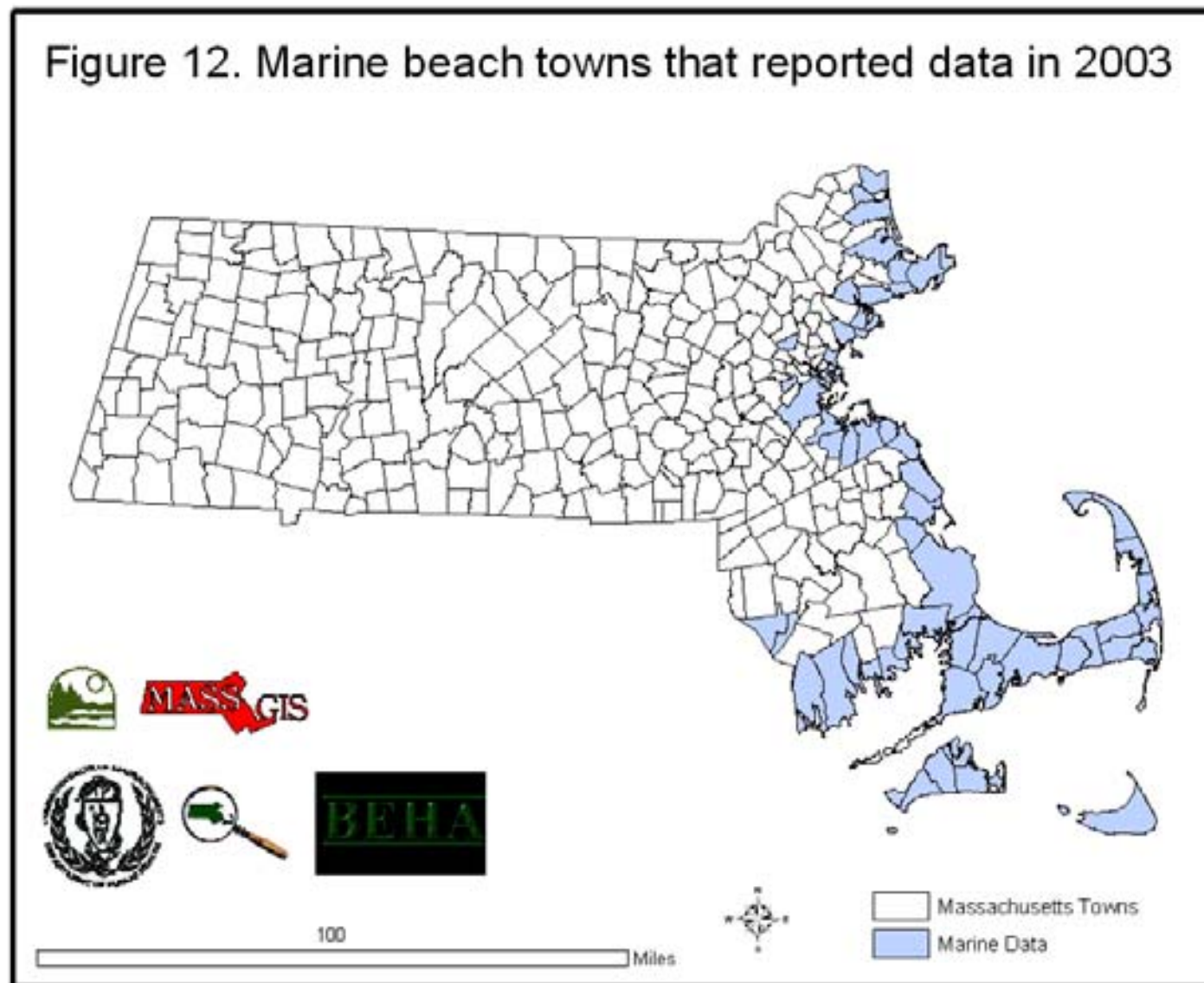


Figure 13. Freshwater beach towns
that reported data in 2003

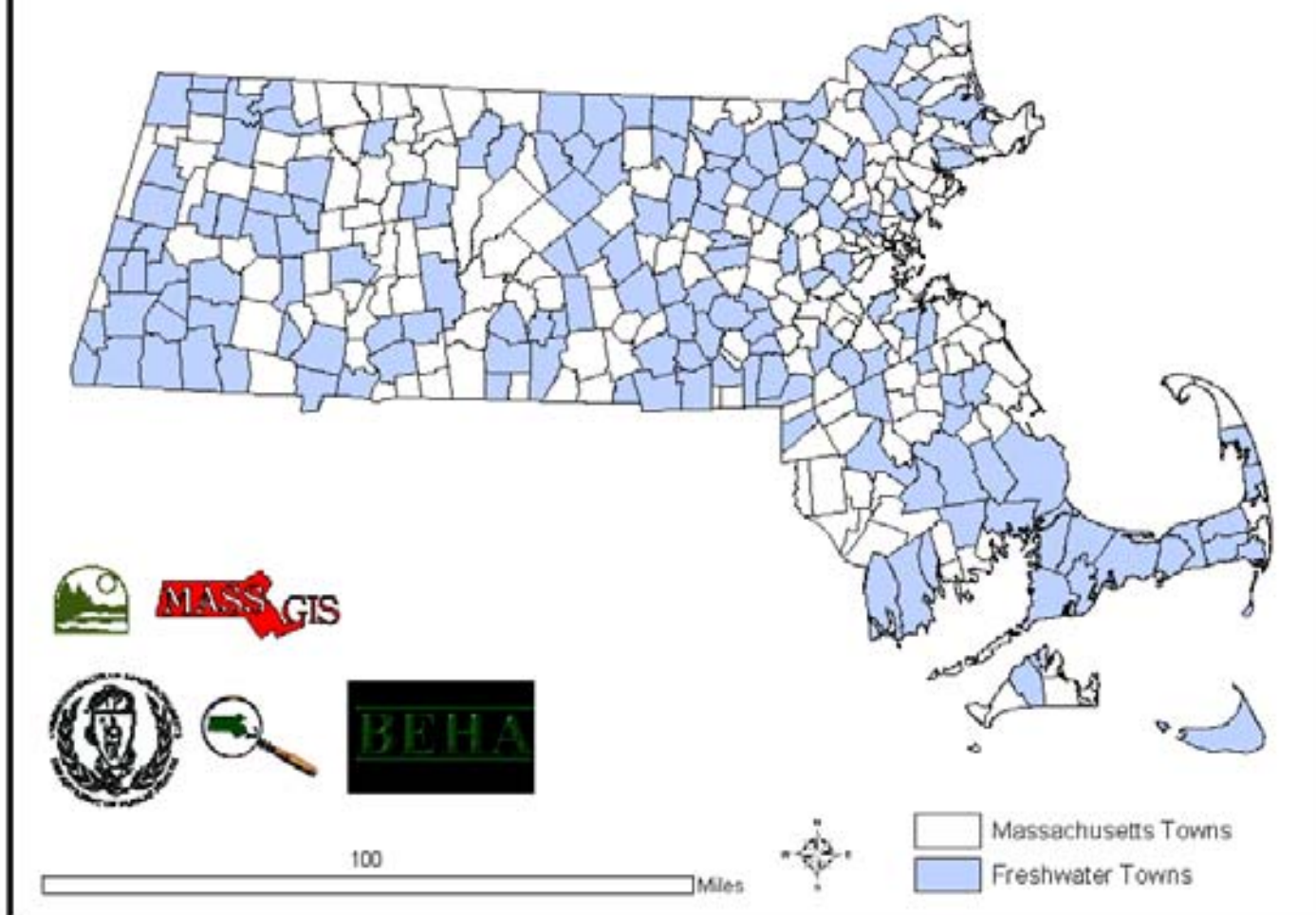


Figure 14. Marine beach towns with at least one water sample exceeding criteria in 2003

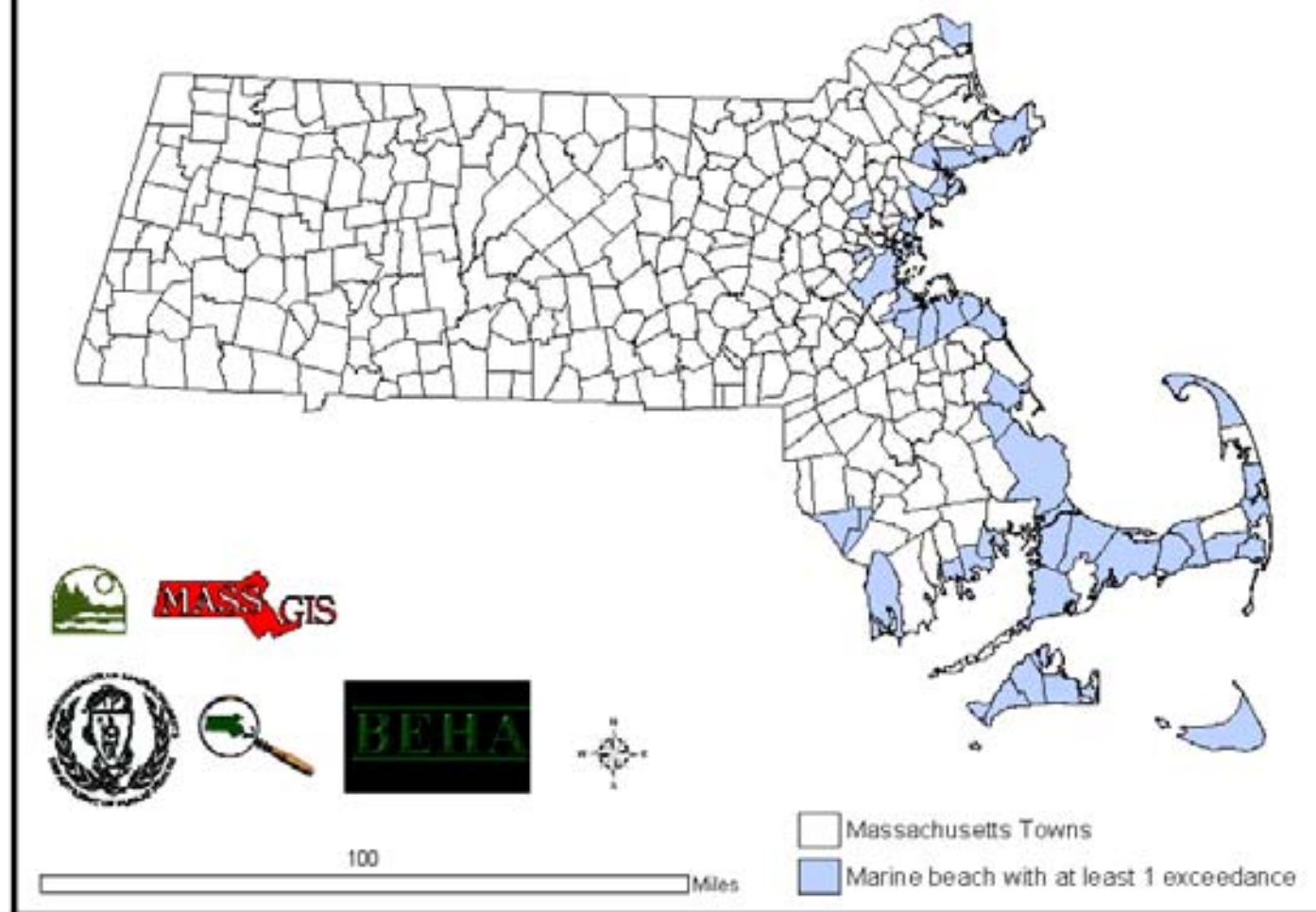


Figure 15. Freshwater beach towns with at least one sample exceeding criteria in 2003

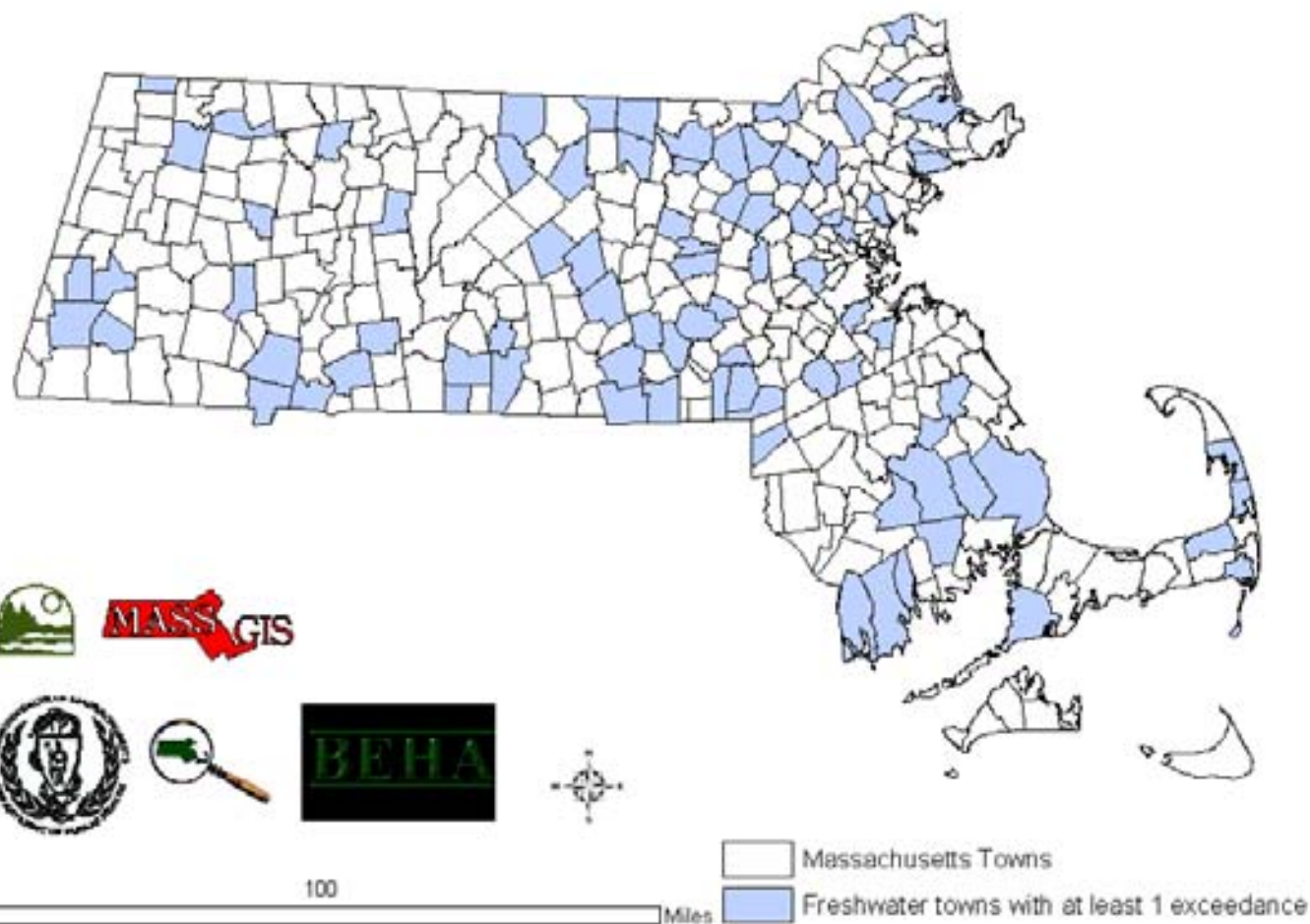


Figure 16: MDPH Public Beach Notification Website: statewide map

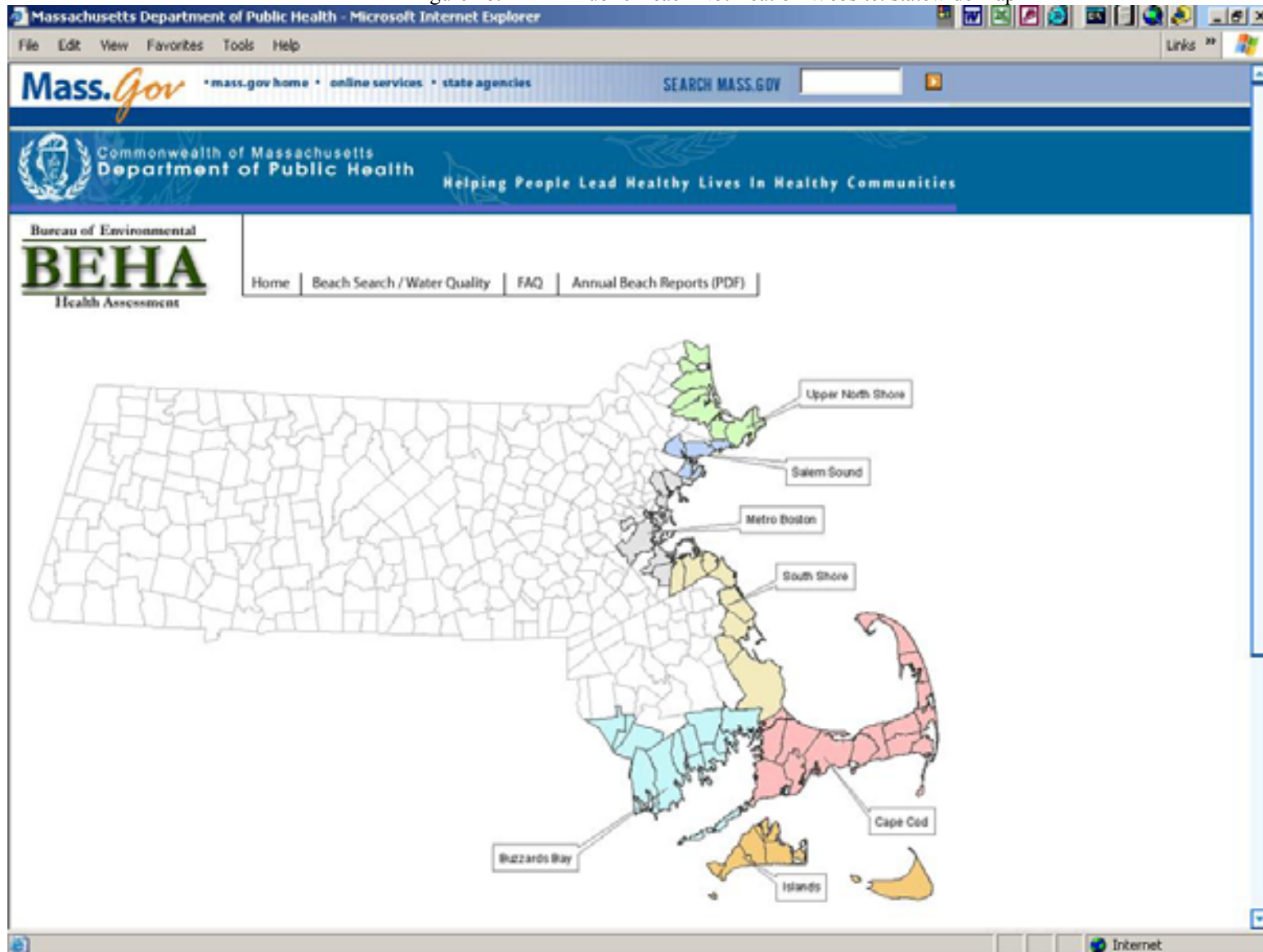


Figure 17: MDPH Public Beach Notification Website: regional map of Cape Cod

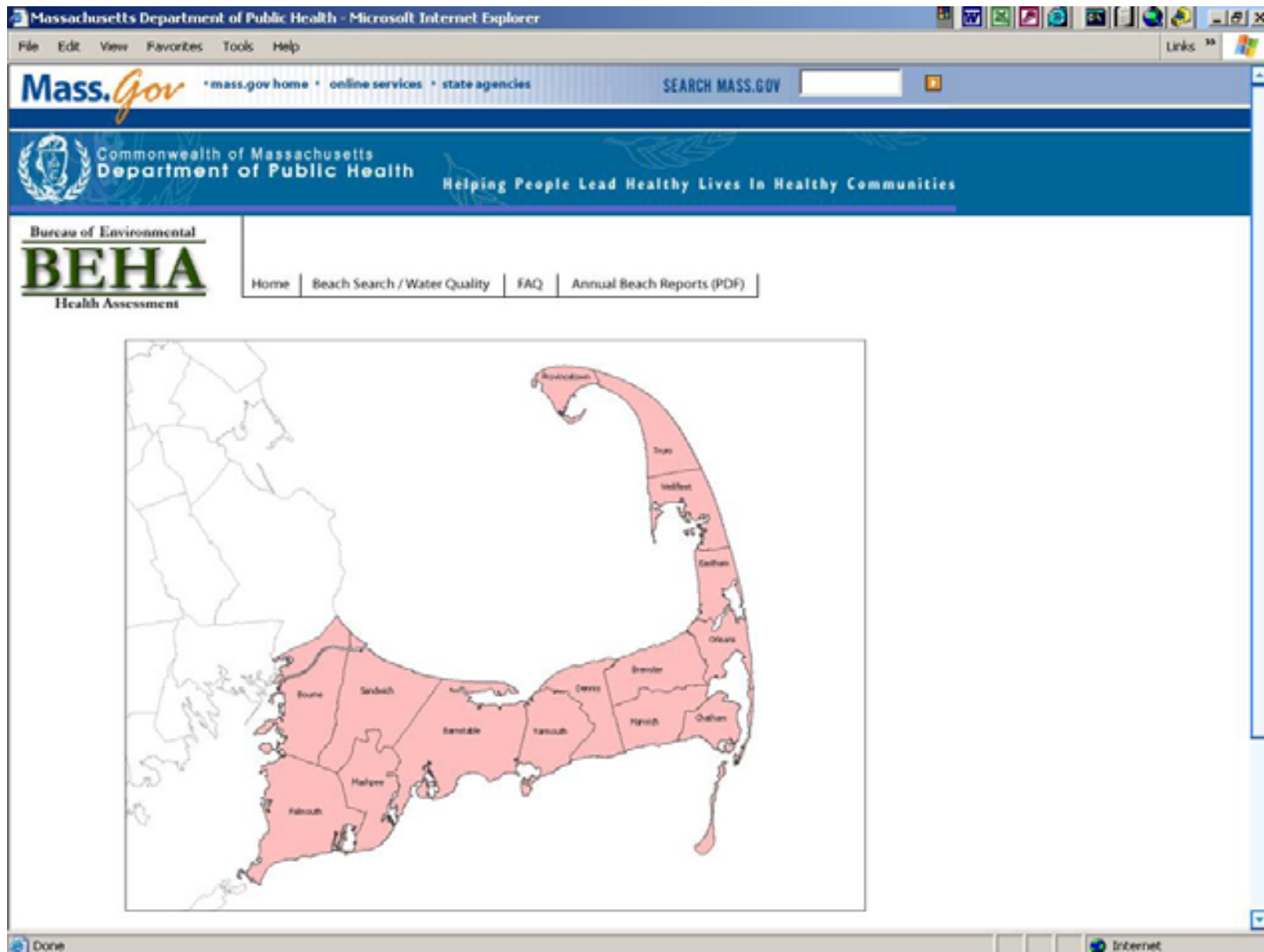
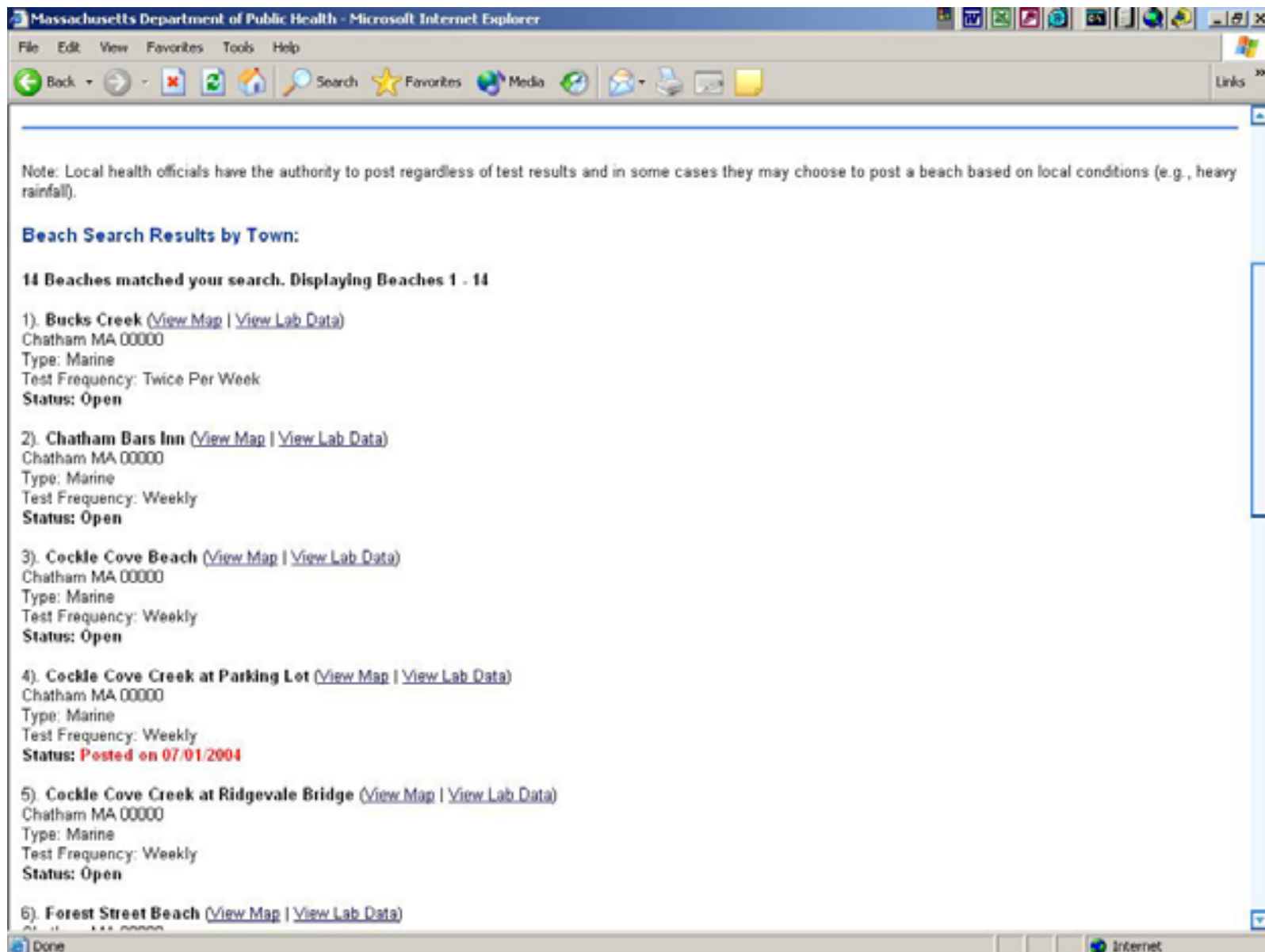


Figure 18: MDPH Public Beach Notification Website: Chatham Beach Posting Data



CHATHAM JACKKNIFE HARBOR BEACH

BEACH ACCESS:
 PUBLIC (blue line)
 PRIVATE (pink line)
 SEMI-PUBLIC (green line)

BEACH MONITORING:
 POSTING LOCATION (red star)
 SAMPLING LOCATION (green star)
 ACCESS POINT (blue dot)
 PARKING LOCATION (blue dot)

CHATHAM JACKKNIFE HARBOR BEACH

CHATHAM RYDERS DOVE BEACH

CHATHAM AVALON POINT ROAD BEACH (unnamed)

CHATHAM OLD SALT WORKS RD BEACH (unnamed)

CHATHAM ISLAND BEACH (unnamed)

CHATHAM SEA PINE ROAD BEACH (unnamed)

CHATHAM WHIDAH ROAD BEACH (unnamed)

CHATHAM SEA PINE ROAD POINT BEACH (unnamed)

Commonwealth of Massachusetts
 Department of Public Health

BEHA

Jul 28, 2003

Figure 20: MDPH GPS Beach Survey map: Hardings West Beach in Chatham



[illegible]

APPENDICES

A. MASSACHUSETTS STATE REGULATIONS

See following pages.

105 CMR 445.000

MINIMUM STANDARDS FOR BATHING BEACHES STATE SANITARY CODE, CHAPTER VII

445.001: Purpose

The purpose of 105 CMR 445.000 is to protect the health, safety and well-being of the users of bathing beaches, to establish acceptable standards for the operation of bathing water and to establish a procedure for informing the public of any bathing water closures.

445.002: Authority

105 CMR 445.000 is adopted under the authority of M.G.L. c. 111, ss. 3,5S and 127A.

445.003: Citation

105 CMR 445.000 shall be known and may be cited as 105 CMR445.000: Minimum Standards for Bathing Beaches (State Sanitary Code, Chapter VII).

445.004: Scope

These regulations shall apply to all public and semi-public bathing beaches.

445.010: Definitions

The words, terms or phrases listed below, for the purpose of 105 CMR 445.000, shall be defined and interpreted as follows:

Bathing Beach means the land where access to the bathing water is provided. It shall not mean a swimming pool as defined in 105 CMR 435.000: Minimum Standards for Swimming Pools (State Sanitary Code, Chapter V).

Bathing Water means fresh or salt water adjacent to any public bathing beach or semi- public bathing beach at the location where it is used for bathing and swimming purposes.

Board of Health means the appropriate and legally designated health authority of the community, or other legally constituted governmental unit within the Commonwealth having the usual powers and duties of the board of health of a city or town, or its authorized agent or representative.

Department means the Department of Public Health.

Operator means any person who

- (a) alone or jointly or severally with others has legal title to a bathing beach whether or not that person has legal title or control of the bathing water; or
- (b) has care, charge or control of such bathing beach as agent or lessee of the owner or an independent contractor.

Person means any individual or any partnership, corporation, firm, association or group, or the Commonwealth, or any of its agencies, authorities or departments or any political subdivisions of the Commonwealth, including municipalities or other legal entity.

Public Bathing Beach means any bathing beach open to the general public, whether or not any entry fee is charged, that permits access to bathing waters.

Semi-Public Bathing Beach means any bathing beach used in connection with a hotel, motel, a manufactured home park, campground, apartment house, condominium, country club, youth club, school, camp or other similar establishment where the primary purpose of the establishment is not the operation of the bathing beach, and where admission to the use of the bathing beach is included in the fee consideration paid or given for the primary use of the premises. Semi-Public Bathing Beach also means a bathing beach operated solely for the use of members and guests of an organization that maintains such a bathing beach.

Private Bathing Beach means any bathing beach not considered to be a public or semi-public bathing beach.

Sanitary Survey means a written report, conducted by a Massachusetts Registered Sanitary Engineer, Certified Health Officer or Registered Sanitarian, documenting an examination of the bathing water and contiguous land masses for the purpose of identifying actual or potential sources of microbiological or chemical contamination. The sanitary survey shall also include a description of the water circulation associated with the bathing area, the impact of bather load on the bathing beach area and any natural or artificial physical hazards.

445.020: Operation

No operator shall allow bathing or swimming in bathing water whenever in the opinion of the Board of Health or the Department the bathing water is or may be hazardous or unsafe for bathing or swimming. Bathing and swimming at public and semi-public beaches shall be limited to water areas that meet the requirements of 105 CMR 445.030. Any operator of a public or semi-public bathing beach shall comply with the requirements of 105 CMR 445.000.

445.030: Bathing Water Quality

Bathing or swimming shall not be permitted in any bathing water where the quality of the water does not meet the standards established in 105 CMR 445.030(A), 445.030(B), or 445.030(C), and no bathing or swimming shall be allowed when the bathing water is determined by the Board of Health or the Department to be unfit or so subject to contamination as to constitute a menace to health. Bathing or swimming shall not be permitted in bathing waters when:

(A) Physical Quality.

- (1) Sludge deposits, solid refuse, floating waste solids, oils, grease or scum are present; or
- (2) There are safety hazards including, but not limited to, fast currents, sharp drop-offs or an unstable bottom in the wading area(s) or lack of water clarity.

(B) Bacteriological Quality.

- (1) The results of a sanitary survey or other information indicates that sewage or other hazardous substances may be discharged into the bathing water to a degree considered by the Board of Health or the Department to be of public health significance; or
- (2) Epidemiological evidence discloses the prevalence of an infectious disease or other health condition which is considered to be related to the use of the bathing water and is considered by the Board of Health or the Department to be of public health significance; or
- (3) The bacteriological quality of the bathing water is unacceptable as determined by laboratory analysis for the appropriate indicator organisms specified in 105 CMR 445.031 and exceeds the standards established therein.

(C) Oil, Hazardous Materials, or Heavy Metals.

- (1) Oil, hazardous materials, or heavy metals are present in excess of surface water quality standards or guidelines established by the United States Environmental Protection Agency or the Massachusetts Department of Environmental Protection.

445.031: Indicator Organisms

(A) For marine water, the indicator organism shall be Enterococci.

- (1) No single Enterococci sample shall exceed 104 colonies per 100 ml. and the geometric mean of the most recent five (5) Enterococci levels within the same bathing season shall not exceed 35 colonies per 100 ml.

- (B) For fresh water, the indicator organisms shall be E. coli or Enterococci.
- (1) No single E. coli sample shall exceed 235 colonies per 100 ml. and the geometric mean of the most recent five E. coli samples within the same bathing season shall not exceed 126 colonies per 100 ml; or
 - (2) No single Enterococci sample shall exceed 61 colonies per 100 ml. and the geometric mean of the most recent five (5) Enterococci samples within the same bathing season shall not exceed 33 colonies per 100 ml.

445.032 Collection of Bathing Water Samples

(A) Location. The Board of Health, for public and semi-public bathing beaches that are not operated by the Commonwealth, and the Department, for bathing beaches that are operated by the Commonwealth, shall approve sampling locations at each bathing beach in its jurisdiction. Samples of bathing water shall be taken at locations within areas of greatest bather load. Additional samples shall also be obtained at any critical location subject to contamination from business developments, dwellings, streams, sewer outfall pipes or other sources. All required samples shall be obtained from these designated locations.

B) Sample Collection. Samples shall be obtained in accordance with the procedures recommended by the most recent edition of the Standard Methods for the Examination of Water and Waste Water of the American Public Health Association or as approved by the United States Environmental Protection Agency.

(C) Frequency.

- (1) The Board of Health, its agent, or any other authorized person shall collect the bacteriologic samples:
 - (a) Within five days of the opening of the bathing season; and
 - (b) At least weekly during the bathing season at a time and day approved by the Board of Health or the Department; and
 - (c) Prior to reopening a beach after closing for any reason.
- (2) Testing for oil, hazardous materials, or heavy metals shall only be required if the operator, the Board of Health, or the Department has information indicating possible contamination of the bathing beach or bathing waters from oil, hazardous materials or heavy metals.

(D) Field Data. Physical conditions noted at the time of sampling shall be recorded on a form provided by the Department.

(E) Personnel. Samples shall be taken by the Board of Health, the Department, their duly authorized representatives or other qualified persons as determined by the Board of Health or the Department.

445.033: Laboratory Analysis and Reporting

(A) Laboratory Analysis. -Laboratory analysis of bathing water as required by 105 CMR 445.000 shall be conducted in accordance with the most recent edition of the Standard Methods for Examination of Water and Waste Water of the American Public Health Association or as approved by the United States Environmental Protection Agency.

(B) Reporting.

(1) Routine Reporting by Operators. Any operator or authorized agent of a public bathing beach, except public bathing beaches operated by the Commonwealth, and any operator or authorized agent of a semi-public bathing beach shall report the certified results of all testing, monitoring and analysis of bathing water to the Board of Health within five (5) days of receipt of the results from the laboratory.

(2) Reporting by Operators of Levels Exceeding the Established Standards. Any operator or authorized agent of a public or semi-public bathing beach shall immediately report to the Board of Health the results of all testing, monitoring and analysis of bathing water found to exceed the standards established in 105 CMR 445.030.

(3) Reporting by the Board of Health. The Board of Health or its authorized agent shall report the results of all testing, monitoring and analysis of bathing water to the Department no later than October 31 of each year.

445.034 Bathing Beaches Operated by the Commonwealth

State agencies that own or operate a bathing beach shall conduct or cause to be conducted all testing, monitoring, and analysis of bathing water at such bathing beach in accordance with these regulations. If the results of such testing, monitoring and analysis are found to exceed the standards established in 105 CMR 445.030, state agencies shall immediately, and in no event later than 24 hours, report the results of such testing, monitoring and analysis to the Department and the Board of Health in the community where the bathing beach is located. All other results shall be reported to the Department no later than October 31 of each year.

445.035: Sampling and Analysis at Semi-Public Beaches

(A) The operators of semi-public bathing beaches shall pay for the costs of testing, monitoring and analysis of bathing waters adjacent to such semi-public bathing beaches.

(B) Operators of semi-public bathing beaches may enter into contractual agreements with the Board of Health to have the testing, monitoring and analysis of bathing water conducted by the Board of Health, the Department or other qualified persons as determined by the Board of Health or the Department.

445.036: Public Request for Testing

Any person may request that the Board of Health, or in the case of a bathing beach operated by the Commonwealth, the state agency or the Department, conduct testing, monitoring, and analysis of public and semi-public bathing waters when there is reasonable basis to believe that an alleged violation of 105 CMR 445.000 has occurred. The Board of Health or the Department, as appropriate, shall promptly review such requests and determine whether any such testing, monitoring, and analysis is necessary to ensure the public health and safety of bathing waters.

445.040: Posting and Reopening Notifications

(A) Posting. Whenever the bathing water quality does not meet the requirements of 105 CMR 445.030 or after any significant rainstorm at a bathing beach where there has been a history of violations of the water quality requirements contained in 105 CMR 445.030, the Board of Health, its agent, or any other authorized person shall immediately, and in no event later than 24 hours, notify the Department, and post or cause to be posted, a sign, or signs, at the entrance to each parking lot and each entrance to the beach stating:

**WARNING! NO SWIMMING
SWIMMING MAY CAUSE ILLNESS**

and a graphic depiction of a swimmer in a red circle with a diagonal hatch mark. The sign shall also contain the reason for the warning, the date of the posting and the name and telephone number of the board of health.

(B) Reopening. Prior to reopening bathing water posted due to a violation of the standards established in 105 CMR 445.030, the Board of Health, its agent, or any other authorized person shall verify that the certified results of the laboratory analysis are less than the standard specified in 105 CMR 445.031. The operator of any state operated bathing beach shall notify the Department and the Board of Health within 24 hours, or the next business day, of the reopening of the bathing water.

445.100: Variance

(A) The Board of Health may grant a variance from the provisions of 105 CMR 445.000 for any public or semi-public bathing beach not operated by the Commonwealth. The Department may grant a variance for any bathing beach operated by the Commonwealth. In granting a variance, the Board of Health and the Department shall review available epidemiological data and a written sanitary survey of the bathing beach, as provided by the operator. The survey shall include:

- (1) All possible sources of contamination, both bacterial and chemical on the watershed tributary to the bathing beach including the location and volume of:
 - (a) sewage and industrial waste water discharges;
 - (b) storm water overflows;
 - (c) bird and animal populations; and
 - (d) commercial and agricultural drainage.
- (2) The volume and quality of the diluting water, water depth, water surface area, tides and confluence of tributaries, water currents and prevailing winds.

(B) Any variance granted by the Board of Health shall specify the required bacteriological testing schedule, provided that the frequency of bacteriological testing shall not be less than once prior to the bathing season and at least every 30 days thereafter throughout the duration of the bathing season.

- (C) Any variance granted by a Board of Health or the Department shall expire:
- (1) at any time as determined by the Board of Health, but in no instance greater than four years, at which time the operator may apply for an extension, or
 - (2) at any time the results of bacterial test exceed the levels at 105 CMR 445.031.

(D) No variance from the requirement of weekly testing shall be granted until the applicant provides the Board of Health or the Department with water quality data collected for at least two complete and consecutive bathing seasons.

(E) In granting a variance, the Board of Health or the Department must determine that the enforcement of 105 CMR 445.000 would not serve a significant public health purpose and that the granting of the variance will not conflict with the intent and spirit of these minimum standards. Any variance or other modification authorized to be made by these regulations may be subject to such qualification, revocation, suspension, or other expiration as the Board of Health or the Department expresses in its grant. A variance or other modification authorized to be made by this regulation may otherwise be revoked, modified, or suspended in whole or in part, only after the holder thereof has been notified in writing and has been given the opportunity to be heard.

445.101: Variance to be in Writing

(A) Any variance granted by the Board of Health or the Department shall be in writing. Any denial for a variance shall also be in writing and shall contain a brief statement of the reasons for denial. A copy of each variance shall be conspicuously posted for 30 days following its issuance and shall, while it is in effect, be available to the public at all reasonable hours in the office of the clerk of the community, or in the office of the Board of Health and in the case of a variance by the Department, at the Department.

(B) The Board of Health shall submit to the Department a notice of the intent to grant a variance. The Department shall approve, disapprove, or modify the variance within 45 days from receipt thereof. If the Department fails to comment within 45 days, its approval shall be presumed. No alteration of any requirement in these regulations shall be made under any variance until the Department approves it or 45 days has elapsed without comment, unless the Board of Health certifies in writing to the Department that an emergency exists.

445.300: Severability

In the event that any section of 105 CMR 445.000 is found to be invalid or unconstitutional, the remaining sections shall not be affected and shall remain in full force and effect. To this end, the provisions of this regulation are hereby declared severable.

Approved regs.doc

B. GENERAL LAWS OF MASSACHUSETTS

**PART I.
ADMINISTRATION OF THE GOVERNMENT**

**TITLE XVI.
PUBLIC HEALTH**

CHAPTER 111. PUBLIC HEALTH

DUTIES OF THE DEPARTMENT OF PUBLIC HEALTH

**Chapter 111: Section 5S Public bathing waters; minimum sanitation standards;
testing, monitoring and analysis; regulations**

Section 5S. (a) As used in this section, the following words shall have the following meanings:--

""Bathing water", fresh or salt water adjacent to any public bathing beach or semi-public bathing beach in the commonwealth.

""Department", the department of public health.

""Public bathing beach", a beach open to the general public, whether or not an entry fee is charged, that permits access to bathing waters.

""Semi-public bathing beach", a bathing beach used in connection with a hotel, motel, trailer park, campground, apartment house, condominium, country club, youth club, school, camp or similar establishment where the primary purpose of the establishment is not the operation of the bathing beach, and where admission to the use of the bathing beach is included in the fee paid for use of the premises. A semi-public bathing beach shall also include a bathing beach operated and maintained solely for the use of members and guests of an organization that maintains such a bathing beach.

(b) The department, in consultation with local health officers, shall establish minimum sanitation standards to protect bathing waters from contamination from

the following: (1) sludge deposits and solid refuse; (2) floating solid, grease or scum wastes; (3) oil, hazardous material, and heavy metals; and (4) bacteria, including but not limited to, total coliform, fecal coliform and Enterococci bacteria.

(c) Such standards shall establish safe levels of human exposure to such contaminants, and shall further incorporate, at a minimum, the following provisions:--

(1) An officer or an agent of a local board of health shall test, monitor and analyze all bathing waters within its municipality. Every local board of health shall report the results from all testing, monitoring and analysis of bathing waters to the department. The department shall establish such reporting requirements and shall keep public records thereof. The department shall issue an annual report on the state of beach water quality using data that has been reported to the department. The department shall make such data available to the public upon written request.

(2) The department shall determine at which sites to conduct testing and monitoring of bathing waters. The department shall consider, but not be limited to, the following factors in determining at which sites to conduct testing and monitoring of bathing waters: (i) prior testing results pursuant to this section for such bathing waters; (ii) the number of people who use the bathing beach annually; and (iii) whether the beach is located adjacent to a storm water drain, sewage, industrial and commercial wastewater discharges, or commercial, industrial and agricultural drains.

(d) The department shall determine at what frequency to conduct testing, monitoring and analysis of bathing waters. Testing, monitoring and analysis shall be conducted on at least a weekly basis during the bathing season, and at such times and under such conditions as shall be sufficient to protect public health and safety. The department may grant a variance from the weekly testing requirement for a public or semi-public bathing beach only where there is a documented history of no sources of pollution, both point and non-point, at the

bathing beach, or where such pollution sources at the beach have been fully and completely remediated.

(e) The department shall require the posting of conspicuous warning signs to notify the public whenever there is a threat to human health or safety in bathing waters. Signs shall be posted at locations on the beach that are visible to the public in order to inform the public of the nature of the problem and the possibility of a threat to human health and safety. Signs shall be posted immediately after significant rainstorms at bathing beach locations where there has been a chronic history of violations of the department's minimum sanitation standards for bathing beaches after such rainstorms. When an officer or agent of a local board of health discovers a violation of such minimum sanitation standards, the officer or agent shall notify the department immediately, and in no event not later than 24 hours after such discovery. The local board of health shall also post signs immediately, and in no event not later than 24 hours after such a discovery.

(f) A person may request that a local board of health conduct testing, monitoring and analysis of bathing waters when there is a reasonable basis to believe that an alleged violation of such minimum sanitation standards established by this section has occurred. Local boards of health shall promptly review such requests and determine whether any such testing, monitoring and analysis is necessary to ensure the public health and safety in bathing waters.

(g) The owners of semi-public bathing beaches shall be required to pay for the costs of testing, monitoring and analysis of bathing waters adjacent to such semi-public bathing beaches.

(h) Local boards of health may enter into contractual agreements with owners of semi-public bathing beaches where the local board of health conducts testing, monitoring and analysis of such bathing waters.

(i) A municipality or state agency may adopt sanitation standards and testing, monitoring, and analysis requirements for bathing waters within its jurisdiction

that are stricter than the standards adopted by the department. In any case where a municipality or state agency adopts such stricter standards, any warning signs required by this section shall display the results of such stricter standards relative to the standards of the department.

(j) The testing, monitoring and analysis of bathing waters that are under the control of any state agency shall be conducted by that state agency. All such state agencies shall meet the requirements set forth by this section and the regulations promulgated by the department.

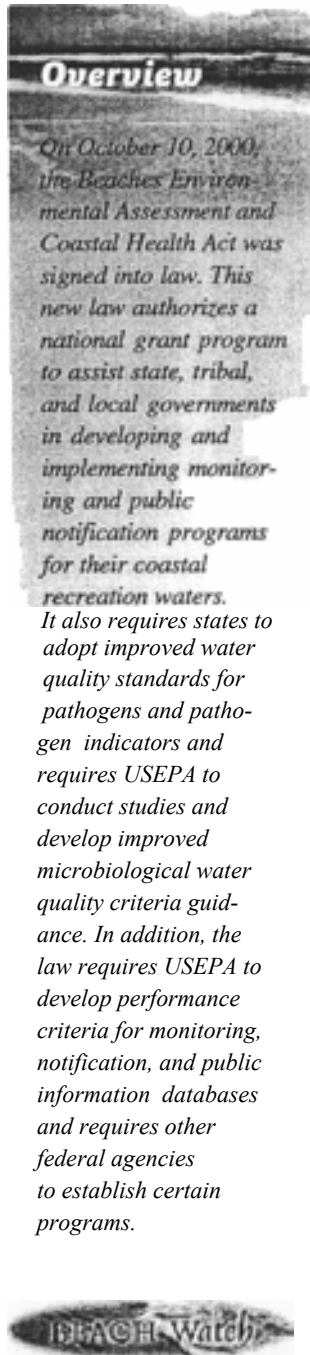
(k) The department may, subject to appropriation, award competitive grants to local boards of health in the form of a 50 per cent reimbursement for the testing, monitoring and analysis of bathing waters and to otherwise carry out the provisions of this section and the regulations promulgated thereunder. The department shall enter into a contractual agreement with a sole provider of testing services to be utilized by any state agency, and which may be utilized by any local board of health, to comply with the provisions of this section.

The department shall also ensure that the provisions of this section and the regulations promulgated thereunder are implemented in a cost effective manner by encouraging, where possible, regional approaches or other cost effective means of carrying out the purposes of this section.

(l) The department shall enforce the provisions of this section in accordance with the penalty and enforcement provisions of section 127A.

C. FEDERAL BEACH ACT

See following pages.



Purpose and Title

This legislation amends the Federal Water Pollution Control Act (also known as the Clean Water Act, or CWA) to improve the quality of coastal recreation waters and attain other objectives. The following summary is provided for the convenience of the reader. It does not substitute for the statute. Grant applicants should consult the statute and applicable grant regulations prior to filing such applications.

XI. Section 1. Short Title

"Beaches Environmental Assessment and Coastal Health Act of 2000"

Water Quality Standards and Criteria

XII. Section 2. Adoption of Coastal Recreation Water Quality Criteria and Standards by States

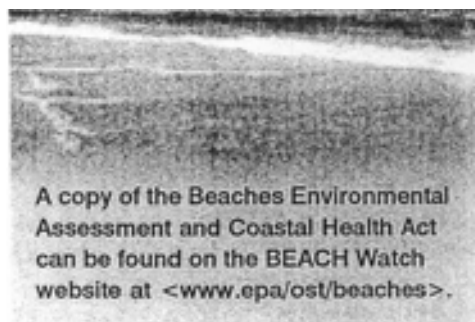
The provisions of this section amend section 303 of the CWA with respect to the following:

- **Initial Criteria and Standards:** *[By April 10, 2004]*, states having coastal recreation waters are required to adopt water quality criteria and standards for pathogens and pathogen indicators for which the USEPA Administrator has published criteria under the act. *[This refers to USEPA's 1986 Water Quality Criteria for Bacteria.]*
- **New or Revised Criteria and Standards:** Requires states to adopt new or revised standards for coastal recreation waters not later than 36 months after the EPA Administrator publishes new or revised criteria guidance for pathogens and pathogen indicators.
- **Failure to Adopt:** If a state fails to adopt criteria and standards for pathogens and pathogen indicators that are "as protective of human health as USEPA criteria *[by April 10, 2004]*," the USEPA Administrator shall promptly propose regulations setting forth revised criteria and standards.

XIII. Section 3. Revisions to Water Quality Criteria

This section adds the following to section 104 of the CWA as "Studies Concerning Pathogen Indicators In Coastal Recreation Waters":

- **New Studies:** *[By October 10, 2003]*, the USEPA Administrator shall complete studies for use in developing: (1) an assessment of potential health risks from exposure to pathogens in coastal recreation waters; (2) appropriate and effective indicators and appropriate, accurate, and expeditious methods for detecting or predicting the presence of pathogens in coastal recreational waters; and (3) guidance for state application of USEPA's criteria guidance for pathogens to account for the diversity of geographic and aquatic conditions.
- **Revised Criteria:** Requires the USEPA Administrator to publish new or revised water quality criteria guidance for pathogens in such waters not later than *October 10, 2005*. Criteria is to be reviewed at least once every five years thereafter.



Monitoring and Notification

XIV. Section 4. Coastal Recreation Water Quality Monitoring and Notification

The provisions of this section amend Title IV of the CWA to add section 406, "Coastal Recreation Water Quality Monitoring and Notification."

This section includes the following provisions:

- **Monitoring and Notification Performance Criteria:** Directs the USEPA Administrator, by April 10, 2002, to publish "performance criteria" for a monitoring and notification grants program. The criteria will address the following topics: (1) the monitoring and assessment of coastal recreation waters adjacent to beaches for attainment of water quality standards for pathogens, including methods for such monitoring and assessment; and (2) prompt notification of local governments, the public, and the EPA Administrator of exceedances, or the likelihood of exceedances, of standards for such waters so that public health and safety can be maintained.
- **Program Development and Implementation Grants:** Authorizes the EPA Administrator to make grants to states, tribes, and local governments to develop and implement monitoring and notification programs. To qualify for an implementation grant, a grantee would need to: (1) be consistent with EPA's performance criteria; (2) prioritize use of grant funds based on use of the water and risk to human health, and identify factors considered in setting priorities; (3) develop a list of waters not subject to the monitoring and notification program due to fiscal constraints; and (4) provide an opportunity for public comment. States may delegate responsibilities and provide funding to local governments to implement a program. Local agencies may also apply for a grant under certain circumstances.
- **Content of State, Tribal, and Local Programs:** As a condition of the grant, a state, tribe, or local government shall: (1) list coastal recreational waters adjacent to beaches used by the public; (2) identify the delegation process; (3) identify monitoring and assessment methods including frequency and location of monitoring; and (4) identify communication procedures and measures.
- **Federal Agency Programs:** Requires Federal agencies to develop programs for certain coastal recreation waters within three years. These programs should be designed to: (1) protect public health and safety; (2) meet USEPA's performance criteria; and (3) address certain other matters required for state and local programs.
- **EPA Database and Technical Assistance:** Directs the EPA Administrator to: (1) establish a national coastal recreation water pollution occurrence database; and (2) provide technical assistance for development of assessment and monitoring procedures for floatable materials in those waters.
- **List of Waters:** EPA is required to maintain a publicly available "list of waters" that are subject to a monitoring and notification program, as well as those not subject to a program because of fiscal constraints.
- **EPA Implementation:** In states that do not have a program consistent with EPA's performance criteria, EPA is required to conduct such a program for listed priority waters using grant funds that otherwise would have been awarded to those states. This "backstop" would commence three years after USEPA lists waters in such states.
- **Authorization of Appropriations:** Authorizes annual appropriations of \$30 million for fiscal years 2001 through 2005. *[Actual funding levels depend on specific appropriations enacted annually by Congress.]*

Other Provisions

XI. Section 5. Definitions

- **Defines "Coastal Recreation Waters":** This term includes: "(i) the Great Lakes and (ii) marine coastal waters (including coastal estuaries) that are designated under section 303(c) by a State for use for swimming, bathing, surfing, or similar water contact activities." The term does not include "(i) inland waters or (ii) waters upstream of the mouth of a river or stream having an unimpaired natural connection with the open sea."

XII. Section 6. Indian Tribes

- **Tribes Are Treated Like States:** Adds language which allows USEPA to treat Indian tribes in a manner similar to states for purposes of section 406 of the act, which include coastal recreation water quality monitoring and notification programs and grants. USEPA already had authority to treat tribes in a manner similar to states for purposes of section 303 of the act.

XI. Section 7. Report

Reporting Schedule: Requires that USEPA report to Congress every four years.

XII. Section 8. Authorization of Appropriations

- **Appropriation Authority:** Authorizes appropriations to carry out the act

PUBLIC LAW 106-284 - OCT. 10, 2000

**BEACHES ENVIRONMENTAL ASSESSMENT
AND COASTAL HEALTH ACT OF 2000**

Public Law 106-284
106th Congress

1. An Act

- A.** To amend the Federal Water Pollution Control Act to improve the quality of coastal recreation waters, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION I. SHORT TITLE.

This Act may be cited as the "Beaches Environmental Assessment and Coastal Health Act of 2000".

SEC. 2. ADOPTION OF COASTAL RECREATION WATER QUALITY CRITERIA AND

STANDARDS BY STATES.

Section 303 of the Federal Water Pollution Control Act (33 U.S.C. 1313) is amended by adding at the end the following:

"(i) COASTAL RECREATION WATER QUALITY CRITERIA.-

"(1) ADOPTION BY STATES.-

"(A) INITIAL CRITERIA AND STANDARDS.-Not later than 42 months after the date of the enactment of this sub- section, each State having coastal recreation waters shall adopt and submit to the Administrator water quality criteria and standards for the coastal recreation waters of the State for those pathogens and pathogen indicators for which the Administrator has published criteria under section 304(a).

"(B) NEW OR REVISED CRITERIA AND STANDARDS.-Not later than 36 months after the date of publication by the Administrator of new or revised water quality criteria under section 304(a)(9), each State having coastal recreation waters shall adopt and submit to the Administrator new or revised water quality standards for the coastal recreation waters of the State for all pathogens and pathogen indicators to which the new or revised water quality criteria are applicable.

"(2) FAILURE OF STATES TO ADOPT.-

"(A) IN GENERAL.-If a State fails to adopt water quality criteria and standards in accordance with paragraph (1)(A) that are as protective of human health as the criteria for pathogens and pathogen indicators for coastal recreation waters published by the Administrator, the Administrator shall promptly propose regulations for the State setting forth revised or new water quality standards for pathogens and pathogen indicators described in paragraph (1)(A) for coastal recreation waters of the State.

"(B) EXCEPTION.-If the Administrator proposes regulations for a State described in subparagraph (A) under sub- section (c)(4)(B), the Administrator shall publish any revised or new standard under this subsection not later than 42 months after the date of the enactment of this subsection.

Publication.

"(3) APPLICABILITY.-Except as expressly provided by this subsection, the requirements and procedures of subsection (c) apply to this subsection, including the requirement in sub- section (c)(2)(A) that the criteria protect public health and welfare."

SEC. 3. REVISIONS TO WATER QUALITY CRITERIA.

(a) STUDIES CONCERNING PATHOGEN INDICATORS IN COASTAL RECREATION WATERS.-Section 104 of the Federal Water Pollution Control Act (33 U.S.C. 1254) is amended by adding at the end the following:

Deadlines.

"(v) STUDIES CONCERNING PATHOGEN INDICATORS IN COASTAL RECREATION WATERS.-Not later than 18 months after the date of the enactment of this subsection, after consultation and in cooperation with appropriate Federal, State, tribal, and local officials (including local health officials), the Administrator shall initiate, and, not later than 3 years after the date of the enactment of this subsection, shall complete, in cooperation with the heads of other Federal agencies, studies to provide additional information for use in developing-

"(1) an assessment of potential human health risks resulting from exposure to pathogens in coastal recreation waters, including nongastrointestinal effects;

"(2) appropriate and effective indicators for improving detection in a timely manner in coastal recreation waters of the presence of pathogens that are harmful to human health;

"(3) appropriate, accurate, expeditious, and cost-effective methods (including predictive models) for detecting in a timely manner in coastal recreation waters the presence of pathogens that are harmful to human health; and

"(4) guidance for State application of the criteria for pathogens and pathogen indicators to be published under section 304(a)(9) to account for the diversity of geographic and aquatic conditions."

(b) REVISED CRITERIA.-Section 304(a) of the Federal Water Pollution Control Act (33 U.S.C. 1314(a)) is amended by adding at the end the following:

"(9) REVISED CRITERIA FOR COASTAL RECREATION WATERS.-

Deadlines.

"(A) IN GENERAL.-Not later than 5 years after the date of the enactment of this paragraph, after consultation and in cooperation with appropriate Federal, State, tribal, and local officials (including local health officials), the Administrator shall publish new or revised water quality criteria for pathogens and pathogen indicators (including a revised list of testing methods, as appropriate), based on the results of the studies conducted under section 104(v), for the purpose of protecting human health in coastal recreation waters.

Publication.

"(B) REVIEWS.-Not later than the date that is 5 years after the date of publication of water quality criteria under this paragraph, and at least once every 5 years thereafter,

the Administrator shall review and, as necessary , revise the water quality criteria."

SEC. 4. COASTAL RECREATION WATER QUALITY MONITORING AND NOTIFICATION.

Title IV of the Federal Water Pollution Control Act (33 U.S.C. 1341 et seq.) is amended by adding at the end the following:

33 USC 1346.

Deadline.
Publication.

406. COASTAL RECREATION WATER QUALITY MONITORING AND NOTIFICATION.

"(a) MONITORING AND NOTIFICATION.-

"(1) IN GENERAL.-Not later than 18 months after the date of the enactment of this section, after consultation and in cooperation with appropriate Federal, State, tribal, and local officials (including local health officials), and after providing public notice and an opportunity for comment, the Administrator shall publish performance criteria for-

"(A) monitoring and assessment (including specifying available methods for monitoring) of coastal recreation waters adjacent to beaches or similar points of access that are used by the public for attainment of applicable water quality standards for pathogens and pathogen indicators; and

"(B) the prompt notification of the public, local governments, and the Administrator of any exceeding of or likelihood of exceeding applicable water quality standards for coastal recreation waters described in subparagraph (A).

"(2) LEVEL OF PROTECTION.-The performance criteria referred to in paragraph (1) shall provide that the activities described in subparagraphs (A) and (B) of that paragraph shall be carried out as necessary for the protection of public health and safety.

"(b) PROGRAM DEVELOPMENT AND IMPLEMENTATION GRANTS.-

"(1) IN GENERAL.-The Administrator may make grants to States and local governments to develop and implement programs for monitoring and notification for coastal recreation waters adjacent to beaches or similar points of access that are used by the public.

"(2) LIMITATIONS.-

"(A) IN GENERAL.-The Administrator may award a grant to a State or a local government to implement a monitoring and notification program if-

"(i) the program is consistent with the performance criteria published by the Administrator under sub- section (a);

"(ii) the State or local government prioritizes the use of grant funds for particular coastal recreation waters based on the use of the water and the risk to human health presented by pathogens or pathogen indicators;

"(iii) the State or local government makes available to the Administrator the factors used to prioritize the use of funds under clause (ii);

"(iv) the State or local government provides a list of discrete areas of coastal recreation waters that are subject to the program for monitoring and notification for which the grant is provided that specifies any coastal recreation waters for which fiscal constraints

will prevent consistency with the performance criteria under subsection (a); and

"(v) the public is provided an opportunity to review the program through a process that provides for public notice and an opportunity for comment.

"(B) GRANTS TO LOCAL GOVERNMENTS.-The Administrator may make a grant to a local government under this subsection for implementation of a monitoring and notification program only if, after the 1-year period beginning on the date of publication of performance criteria under subsection (a)(I), the Administrator determines that the State is not implementing a program that meets the requirements of this subsection, regardless of whether the State has received a grant under this subsection.

"(3) OTHER REQUIREMENTS.-

"(A) REPORT.-A State recipient of a grant under this subsection shall submit to the Administrator, in such format and at such intervals as the Administrator determines to be appropriate, a report that describes-

"(i) data collected as part of the program for monitoring and notification as described in subsection (c); and

"(ii) actions taken to notify the public when water quality standards are exceeded.

"(B) DELEGATION.-A State recipient of a grant under this subsection shall identify each local government to which the State has delegated or intends to delegate responsibility for implementing a monitoring and notification program consistent with the performance criteria published under subsection (a) (including any coastal recreation waters for which the authority to implement a monitoring and notification program would be subject to the delegation).

"(4) FEDERAL SHARE.-

"(A) IN GENERAL.-The Administrator, through grants awarded under this section, may pay up to 100 percent of the costs of developing and implementing a program for monitoring and notification under this subsection.

"(B) NON-FEDERAL SHARE.-The non-Federal share of the costs of developing and implementing a monitoring and notification program may be-

"(i) in an amount not to exceed 50 percent, as determined by the Administrator in consultation with State, tribal, and local government representatives; and

"(ii) provided in cash or in kind.

"(c) CONTENT OF STATE AND LOCAL GOVERNMENT PROGRAMS.-

As a condition of receipt of a grant under subsection (b), a State or local government program for monitoring and notification under this section shall identify-

"(1) lists of coastal recreation waters in the State, including coastal recreation waters adjacent to beaches or similar points of access that are used by the public;

"(2) in the case of a State program for monitoring and notification, the process by which the State may delegate to local governments responsibility for implementing the monitoring and notification program;

"(3) the frequency and location of monitoring and assessment of coastal recreation waters based on-

"(A) the periods of recreational use of the waters;

"(B) the nature and extent of use during certain periods;

"(C) the proximity of the waters to known point sources and nonpoint sources of pollution; and

"(D) any effect of storm events on the waters;

"(4)(A) the methods to be used for detecting levels of pathogens and pathogen indicators that are harmful to human health; and

"(B) the assessment procedures for identifying short-term increases in pathogens and pathogen indicators that are harmful to human health in coastal recreation waters (including increases in relation to storm events);

"(5) measures for prompt communication of the occurrence, nature, location, pollutants involved, and extent of any exceeding of, or likelihood of exceeding, applicable water quality standards for pathogens and pathogen indicators to--

"(A) the Administrator, in such form as the Administrator determines to be appropriate; and

"(B) a designated official of a local government having jurisdiction over land adjoining the coastal recreation waters for which the failure to meet applicable standards is identified;

"(6) measures for the posting of signs at beaches or similar points of access, or functionally equivalent communication measures that are sufficient to give notice to the public that the coastal recreation waters are not meeting or are not expected to meet applicable water quality standards for pathogens and pathogen indicators; and

"(7) measures that inform the public of the potential risks associated with water contact activities in the coastal recreation waters that do not meet applicable water quality standards.

Deadline.

"(d) FEDERAL AGENCY PROGRAMS.-Not later than 3 years after the date of the enactment of this section, each Federal agency that has jurisdiction over coastal recreation waters adjacent to beaches or similar points of access that are used by the public shall develop and implement, through a process that provides for public notice and an opportunity for comment, a monitoring and notification program for the coastal recreation waters that-

"(1) protects the public health and safety;

"(2) is consistent with the performance criteria published under subsection (a);

Reports.

"(3) includes a completed report on the information specified in subsection (b)(3)(A), to be submitted to the Administrator; and

"(4) addresses the matters specified in subsection (c) .

Public
Information.

"(e) DATABASE.-The Administrator shall establish, maintain, and make available to the public by electronic and other means a national coastal recreation water pollution occurrence database that provides-

"(1) the data reported to the Administrator under subsections (b)(3)(A)(i) and (d)(3); and

"(2) other information concerning pathogens and pathogen indicators in coastal recreation waters that-

"(A) is made available to the Administrator by a State or local government, from a coastal water quality monitoring program of the State or local government; and

"(B) the Administrator determines should be included.

"(f) TECHNICAL ASSISTANCE FOR MONITORING FLOATABLE MATERIAL.-The Administrator shall provide technical assistance to States and local governments for the development of assessment and monitoring procedures for floatable material to protect public health and safety in coastal recreation waters.

"(g) LIST OF WATERS.-

"(1) IN GENERAL.-Beginning not later than 18 months Deadline. after the date of publication of performance criteria under subsection (a), based on information made available to the Administrator, the Administrator shall identify, and maintain a list of, discrete coastal recreation waters adjacent to beaches or similar points of access that are used by the public that-

"(A) specifies any waters described in this paragraph that are subject to a monitoring and notification program consistent with the performance criteria established under subsection (a); and

"(B) specifies any waters described in this paragraph for which there is no monitoring and notification program (including waters for which fiscal constraints will prevent the State or the Administrator from performing monitoring and notification consistent with the performance criteria established under subsection (a)).

"(2) AVAILABILITY.-The Administrator shall make the list Public Information described in paragraph (1) available to the public through-

"(A) publication in the Federal Register; and Federal Register,

"(B) electronic media. Publication.

"(3) UPDATES.-The Administrator shall update the list described in paragraph (1) periodically as new information becomes available.

"(h) USEPA IMPLEMENTATION.-In the case of a State that has no program for monitoring and notification that is consistent with the performance criteria published under subsection (a) after the last day of the 3-year period beginning on the date on which the Administrator lists waters in the State under subsection (g)(I)(B), the Administrator shall conduct a monitoring and notification program for the listed waters based on a priority ranking established by the Administrator using funds appropriated for grants under subsection (i)-

"(1) to conduct monitoring and notification; and

"(2) for related salaries, expenses, and travel.

"(i) AUTHORIZATION OF APPROPRIATIONS.- There is authorized to be appropriated for making grants under subsection (b), including implementation of monitoring and notification programs by the Administrator under subsection (h), \$30,000,000 for each of fiscal years 2001 through 2005."

SEC. 5. DEFINITIONS.

Section 502 of the Federal Water Pollution Control Act (33 U.S.C. 1362) is amended by adding at the end the following:

"(21) COASTAL RECREATION WATERS.-

"(A) IN GENERAL.-The term 'coastal recreation waters' means-

"(i) the Great Lakes; and

"(ii) marine coastal waters (including coastal estuaries) that are designated under section 303(c) by a State for use for swimming, bathing, surfing, or similar water contact activities.

"(B) EXCLUSIONS.- The term 'coastal recreation waters' does not include-

"(i) inland waters; or

"(ii) waters upstream of the mouth of a river or stream having an unimpaired natural connection with the open sea.

"(22) FLOATABLE MATERIAL.-

"(A) IN GENERAL.- The term 'floatable material' means any foreign matter that may float or remain suspended in the water column.

"(B) INCLUSIONS.-The term 'floatable material' includes-

"(i) plastic;

"(ii) aluminum cans;

"(iii) wood products;

"(iv) bottles; and

"(v) paper products.

"(23) PATHOGEN INDICATOR.-The term 'pathogen indicator' means a substance that indicates the potential for human infectious disease."

SEC. 6. INDIAN TRIBES.

Section 518(e) of the Federal Water Pollution Control Act (33 U.S.C. 1377(e)) is amended by striking "and 404" and inserting "404, and 406".

33 USC 1375a.
Deadline.

SEC. 7. REPORT.

(a) IN GENERAL.-Not later than 4 years after the date of the enactment of this Act, and every 4 years thereafter, the Administrator of the Environmental Protection Agency shall submit to Congress a report that includes-

(1) recommendations concerning the need for additional water quality criteria for pathogens and pathogen indicators and other actions that should be taken to improve the quality of coastal recreation waters;

(2) an evaluation of Federal, State, and local efforts to implement this Act, including the amendments made by this Act; and

(3) recommendations on improvements to methodologies and techniques for monitoring of coastal recreation waters. (b) COORDINATION.-The Administrator of the Environmental Protection Agency may coordinate the report under this section with other reporting requirements under the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.).

SEC. 8. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to carry out the provisions of this Act, including the amendments made by this Act, for which amounts are not otherwise specifically authorized to be appropriated, such sums as are necessary for each of fiscal years 2001 through 2005.

Approved October 10, 2000

LEGISLATIVE HISTORY—H.R. 999 (S. 522):

HOUSE REPORTS: No. 106-98 (Comm. on Transportation and Infrastructure).

SENATE REPORTS: No. 106-366 accompanying S. 522 (Comm. on Environment and Public Works).

CONGRESSIONAL RECORD:

Vol. 145 (1999): Apr. 22, considered and passed House.

Vol. 146 (2000): Sept. 21, considered and passed Senate, amended. Sept. 26, House concurred in Senate amendment.

WEEKLY COMPILATION OF PRESENTIAL DOCUMENTS, Vol. 36 (2000):

Oct. 10, Presidential statement.

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